ESTABLISHING AN INTERNATIONAL PROGRAM
IN THE
BUREAU OF LAND MANAGEMENT

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"The fourth principle is a recognition that environmental problems respect no borders...we're working with nations around the world to provide leadership in finding cooperative, international solutions."

President George Bush
June 8, 1989

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INTRODUCTION

The Bureau of Land Management (BLM) has been involved in international activities for almost forty years. Bureau employees have provided technical assistance and training to a wide variety of countries including Canada, Brazil, China, Indonesia, New Zealand, Nigeria, Pakistan and Saudi Arabia. They have participated in international conferences and bilateral scientific exchanges on such topics as automated land information systems, cadastral survey, desertification, silviculture, and mined land reclamation. And they have negotiated and implemented firefighting and other agreements with Canada and Mexico.[1]

While BLM employees have participated in international activities for decades, the agency as a whole has tended to view such activities as being, at best, tangential to its overall mission. In many respects this is not surprising. A significant number of these activities have been conducted at the request of and funded by the Agency for International Development (AID) as part of the foreign assistance program of the United States Government. A relatively small number of agency employees have been involved. And there has been little perceived direct relationship between such international activities and domestic resource management problems and opportunities.

The Bureau also has tended to approach these activities in a rather ad hoc manner. Projects generally have been initiated by foreign governments or other U.S. agencies such as the State Department or AID. They have been reviewed and approved on a case by case basis. Once completed, there has been little institutional interest in evaluating a project's success or in following-up on proposed recommendations.[2]

While this perception of and this approach to international affairs may have been appropriate for the Bureau at one time, they are increasingly dysfunctional. The agency cannot afford to view international activities as tangential to its mission nor can it afford to manage its international affairs in such an ad hoc manner.

The first section of this paper outlines what the Bureau needs from and can offer other countries. This is followed by a discussion about some of the issues the BLM will have to wrestle with in establishing an international program. The last section sets forth a series of recommended action items.

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[1] See Appendices A and B for summaries of the BLM's past and current international activities.

[2] Not all of the BLM's international activities have been or are managed on an ad hoc basis. Examples to the contrary are the international work the agency has done with respect to fire management and cadastral survey.

SECTION I: THE INTERNATIONAL DIMENSION

Increasingly the management and use of natural resources must be viewed from an international as well as a local or regional perspective. This imperative arises out of a growing awareness that resource management practices in one part of the world influence, and in turn are influenced by, events in other parts of the world.[3] It also reflects an increasing willingness on the part of the nations of the world to acknowledge common problems and to share information about their respective resource management successes and failures.

The public lands are not exempt from this imperative. The BLM has a number of management needs that can only be met by working with other countries. It also has an immense amount of practical resource management experience to share with other countries.

THE BLM'S NEEDS

To effectively manage the public lands, the BLM must be aware of what is going on in other countries. Specifically, the BLM should be able to:

- o Participate in scientific exchanges and research and development projects with other countries. Many other countries are funding research and development projects that may be directly applicable to managing the public lands. Both Germany and Australia, for example, have active R&D projects involving automated land information systems. Or to cite another example, a BLM scientist recently went to the Soviet Union to collect biological control agents for noxious weeds in the United States. By entering into cooperative arrangements with other countries, the BLM can in effect leverage its research and development capabilities.

- o Monitor global socio-economic and environmental trends that may influence and in turn be influenced by the management of the public lands. Some transnational environmental and economic trends have a direct impact on public lands. A global increase in temperature, for example, is predicted to increase the incidence of wildfire in the western United States. Other trends may have an indirect affect. Tropical deforestation, for instance, has certainly influenced the public perception of BLM and Forest Service forest management practices.

- o Work with Canada, Mexico, and Central America to address transboundary management problems and opportunities. Examples of such cooperative projects include working with Canada on wildfire suppression and on evaluating the proposed right-of-way for the Altamont natural gas pipeline, working with Mexico on where the Continental Divide Trail should cross the border, and working with Central American governments to cooperatively manage neotropical migratory bird habitat and to adopt excess wild horses and burros for agricultural purposes.

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[3] See Appendix C for a copy of a recent Congressional Research Service background paper on international environmental issues.

o Share management successes and failures. There are a significant number of governmental and non-governmental organizations in other countries whose management experiences are relevant to the management of the public lands. There are, for example, governmental agencies in China which have years of experience in managing arid and semi-arid grasslands. The BLM can learn from their successes and failures.

THE BLM'S OPPORTUNITIES

In recent months, the BLM has been contacted by a number of foreign countries including Australia, China, Czechoslovakia, Germany, India, Japan, Mexico, Poland, Portugal, Romania and the USSR. Some of these contacts have been relatively straightforward, one-time requests for information. Others have been expressions of interest in exchanging scientific and technical information on a regular basis. Still others have been requests for technical assistance and training.

It is clear from these inquiries that governmental and non-governmental organizations in other countries perceive the BLM as having a number of areas of unique expertise. Such areas of expertise include:

o Establishing and tracking property rights. The BLM has over two hundred years of experience in establishing private rights to publicly-owned resources. We know how to determine if land is suitable for a particular use and how to identify measures to reduce potentially adverse environmental impacts. We know how to appraise values, organize sales, issue leases and enforce lease terms. And we know how to survey, record and track the rights established. As we automate our land information systems, we are significantly expanding our ability to efficiently store, retrieve and utilize such land and resource data. Other agencies may have more expertise than the BLM in managing specific resources but none of them have as much expertise in creating and managing usufruct.[4]

While we often take this expertise for granted, many foreign nationals don't. In the late 1970's, the BLM provided technical assistance to the Saudi Arabian government for an agricultural settlement program. In the early 1980's the Bureau provided the Indonesian Government with assistance in surveying, mapping and recording land tenure. Last year we received requests for such assistance from the Chinese and Indian Governments. More recently, a consultant for the World Bank contacted the BLM about helping the Polish Government establish a mineral leasing system in that country.

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[4] Webster's New Collegiate Dictionary defines usufruct as "the legal right of using and enjoying the fruits or profits of something belonging to another."

o Managing for a variety of different and often competing uses. With the exception of the Forest Service, the BLM is the only Federal natural resource agency that manages publicly-owned land for a wide variety of different and often competing uses. Over the years we have developed systematic procedures to identify, evaluate and select among alternative potential land uses. We have learned how to condition use authorizations to protect and enhance other resource values and to accommodate other land users. And, given our fractured land ownership, we have learned how to manage natural resources in close cooperation with other levels and units of government, adjacent land owners and a multitude of public land users.

Given this experience in multiple use management, the BLM is in many respects uniquely positioned to provide technical advice and assistance to other countries in designing projects that are both economically sound and environmentally sustainable -- precisely the type of project that is of increasing interest to the bilateral and multilateral lending institutions and the United Nations.[5]

o Restoring degraded and disturbed areas. The BLM has a significant amount of on-the-ground experience in restoring degraded riparian areas and upland rangelands and in reclaiming abandoned mining sites, oil wells, hazardous materials sites, access roads and other disturbed areas. Much of this experience is in arid and semi-arid environments and thus is particularly relevant to Australia, China, the Soviet Union and other countries with extensive deserts and grasslands.[6]

o Providing technical services. The BLM's technical expertise in fire management, aviation, and communication systems is well-recognized both here in the United States and abroad. The BLM co-sponsored the 1989 International Wild Fire Conference in Boston, Massachusetts, and is helping to organize the upcoming Latin American Fire Prevention Conference. The Boise Interagency Fire Center, also answers well over a hundred inquiries a year for information on fire management and frequently responds to requests from the Office of Foreign Disaster Assistance for support with personnel and equipment.

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[5] See for example, the World Commission on Environment and Development report entitled Our Common Future (1987) or the World Bank report entitled Striking a Balance, the Environmental Challenge of Development (1989).

[6] A surprisingly large percentage of the Earth's surface is like the public lands. According to the United Nations about half the land area of the world is rangeland. See the FAO's 1986 Production Year Book, Table 1.

Most if not all of the U.S. natural resource agencies face somewhat similar needs and opportunities. Most of them have established international programs. In fact, the BLM is the only U.S. land management agency and one of the few U.S. natural resource agencies that does not have an established international program.[7]

The BLM cannot effectively meet these needs or explore these opportunities with an ad hoc approach. If the BLM wants to participate in these global aspects of natural resource management, it must establish a formal international program. Only by creating a formal program will the BLM be able to develop and maintain the knowledge and skills base required to work at the international level and be able to establish and maintain the necessary contacts in other Federal agencies and international organizations. Only through an established program will the agency be able to effectively focus scarce resources, ensure that information is disseminated within the agency, and guarantee that commitments are met.

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[7] The Bureau of Reclamation, the Environmental Protection Agency, the Fish and Wildlife Service, the Forest Service, the National Park Service, the Soil Conservation Service, and the U.S. Geological Survey all have established international programs which are, on the whole, growing.

SECTION II: THE PROPOSED PROGRAM

If the BLM decides to establish an international program, it will have to wrestle with a number of issues including rather predictable questions about purpose, statutory authority, staffing and organizational arrangements, and funding. Each of these issues is briefly discussed below.

PURPOSE

The purpose of the BLM's international program should be to enhance the agency's ability to effectively participate in the international aspects of resource management. Specifically, the program should be designed to enhance the agency's ability to:

- o Monitor transnational economic and environmental trends that may effect the management of the public lands.
- o Work with Canada, Mexico and Central America on transboundary management problems and opportunities.
- o Participate in scientific and technical exchanges and joint research and development projects with other countries.
- o Provide technical assistance and training to other countries.

AUTHORITY

Over the years questions have been raised from time to time about the BLM's statutory authority to engage in international activities. Among the attorneys who have looked into this issue, there appears to be a consensus that the BLM has the legal authority to initiate and participate in international activities that will help the agency accomplish its domestic mission. There also appears to be a consensus that it is legal for the BLM to provide technical assistance and training to another country if it is paid for through the World Bank, the Agency for International Development, and/or by the requesting foreign government. There are, however, recurrent uncertainties about whether it is legal for the BLM to use its appropriations to fund activities primarily intended to help other countries.

These uncertainties are by no means unique to the BLM. Somewhat similar questions have been raised about other Interior agencies. To resolve these questions once and for all, the Department is considering recommending legislation to grant the Secretary of the Interior blanket authority to use appropriated funds for international work. If such legislation is enacted, the Secretary's expanded authority could be delegated to agencies in the Department.

In the absence of such clarifying legislation, the BLM can fund international activities that serve the first three purposes outline above. Until the BLM receives such authorization it, however, should not rely on its own appropriations to provide technical assistance and training to other countries.

STAFFING AND ORGANIZATIONAL ARRANGEMENTS

In the late 1970's and early 1980's, there were three people in the Washington Office assigned to work on international affairs - 2 professionals and 1 clerk-typist on a part-time basis. This staff was initially part of the Division of Cooperative Relations and then merged into the Division of Personnel. At the present time, there is one person in the Division of Personnel who is responsible for facilitating the Bureau's international activities as a collateral responsibility. The two full-time positions that had been previously allocated to administer foreign affairs were assigned to other program areas.

If the BLM establishes an international program, it must expand the number of staff allocated to it. At a minimum, this should include: an international program staff in the Washington Office; designated contacts in the State Offices, the Denver Service Center, the Boise Interagency Fire Center, and the Phoenix Training Center; and designated project managers for any ongoing international projects that may be established. Each of these components is briefly discussed below.

The Washington Office Staff:

The international program staff in the Washington Office should be responsible for fulfilling at least the following functions:

- o Provide program oversight and direction, including ensuring that the BLM's international activities are conducted in accordance with relevant Department of State and Department of Interior regulations and procedures; developing policies and procedures to further clarify the role of the BLM in international activities; preparing required reports and other program documents; and identifying opportunities for cooperative exchanges and technical assistance.

- o Provide assistance to program staffs and field offices, including processing requests for foreign travel authorization; securing passports and visas; assisting with security and medical clearances; providing advice on protocol and information about other countries; distributing trip reports and other information within the agency; and helping prepare and process proposals for scientific and technical exchanges and technical assistance or training projects.

- o Serve as principle liaison with the Department, including keeping the Assistant Secretaries for Lands and Minerals Management and Territorial and International Affairs apprised of current and potential international activities; responding to Departmental requests for information; and preparing required Departmental reports.

- o Facilitate interagency coordination, including exchanging information with the bilateral and multilateral lending institutions and nongovernmental organizations; and working with other U.S. agencies to promote collaborative international projects and to minimize duplication of services.

- o Provide assistance to foreign governments and visitors, including ensuring that requests for information are answered; arranging briefings; and coordinating field visits.

The Washington Office's international staff will not be able to fulfill these functions effectively if they are buried in a Division. A separate office should be created and assigned to either the Deputy Director, the Deputy Director for External Affairs or the Assistant Director for Support Services.

The Field Staff:

There should be a designated international program contact in each State Office with an interest in international activities. There should also be a designated contact at the Denver Service Center, the Boise Interagency Fire Center and the Phoenix Training Center. These individuals should be responsible for fulfilling for their respective organizations the functions outlined above for the Washington Office staff. Given the agency's existing level of involvement in international affairs, these assignments would be collateral responsibilities for at least the next several years.

The Project Managers:

Most of the BLM's existing international activities are comparatively straightforward, one time events. The agency is, however, involved in a number of ongoing international activities. The BLM is, for example, a party to a number of existing international agreements and committees.[8] The agency is also involved in a number of potentially long term projects including:

o A Proposed Science and Technology Protocol with China. At the invitation of Wang Xianjin, the Director General of State Land Administration (SLA), the BLM sent a delegation to the People's Republic of China in May of 1989. The primary purpose of the delegation's visit was to discuss a proposed protocol under the U.S. - China Science and Technology Cooperation Agreement to exchange information on land use planning, land use recordation systems and land reclamation. Low level discussions about the proposed protocol have continued with SLA since the government suppressed the student demonstrations in Tiananmen Square. SLA recently proposed sending a delegation to the United States this October.[9]

o A NATO/CCMS Pilot Study on Desertification. The BLM is participating in a pilot study on desertification sponsored by the North Atlantic Treaty Organization's Committee on the Challenges of Modern Society (NATO/CCMS).[10]

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[8] For a listing of existing international agreements and committees in which the BLM participates, see Appendix B, Part I.

[9] See Appendix D for copies of the proposed protocol and recent correspondence with the State Land Administration.

[10] See Appendix E for information on the NATO/CCMS pilot study on desertification.

- A Joint US/USSR Global Change Research Proposal. Working with the Center for Ecological Studies and the Alpine Geophysical Institute in the USSR, the BLM has prepared a research proposal to monitor four paired wilderness sites in the Soviet Union and North America to assess the conditions of and any changes in atmospheric characteristics, water quality, aquatic plants and animals and vegetation.[11]

For each such ongoing project there should be a designated project manager from either the Washington Office program staff or the field organization most directly affected. This individual should be responsible for overall management of the project. While the international staff in the Washington Office and the Field should coordinate, monitor and provide ongoing support to such projects, they should not be relied on to either develop or implement such projects.

FUNDING

There are three possible sources of funding for expanding the scope of BLM's international activities:

- Redirecting existing appropriated funds;
- Requesting the Administration and the Congress to appropriate additional funds to the BLM specifically for international activities; and
- Relying on the World Bank, AID, and other international lending institutions to fund the BLM to provide technical assistance and training to other countries.

The first source may be adequate to establish a modest international staff in the Washington Office and to slightly expand the scope of the BLM's existing international activities. This source will not, however, be sufficient to significantly increase the BLM's participation in scientific and technical exchanges or the BLM's ability to provide technical assistance and training to foreign countries. If the agency wants to participate in such exchanges or provide such assistance it will have to explore the other two potential funding sources. This being the case, the BLM should view whatever funds may be redirected as "seed" funds -- as resources to develop the institutional capacity within the agency to support such activities.[12]

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[11] See Appendix F for a copy of this research proposal.

[12] Extrapolating from the Agency's log of foreign travel, we estimate that the BLM expended at least $150,000, exclusive of salary, and 9 FTE on international activities in FY 1989.

SECTION III: RECOMMENDED ACTIONS

A. The following actions are recommended to develop the BLM's institutional capacity to undertake international activities:

1. Establish an interim international staff (IIS) in the Washington Office to perform functions outlined above until a permanent staff is established.

   Lead: 101 Completion Date: 9/15/90

2. Visit other Federal natural resource agencies to learn about their statutory authority, funding sources, organizational structure, administrative procedures, and program focus.

   Lead: IIS Completion Date: Ongoing

3. Prepare draft functional statement and position descriptions for the permanent staff.

   Lead: IIS w/ 830 & 840 Completion Date: 11/15/90

4. Prepare recommendations on location of the Washington Office staff and on short-term and long-term funding for the international program.

   Lead: IIS w/ 150, 840 & 880. Completion Date: 12/15/90

5. Establish permanent staff in the Washington Office.

   Lead: 100/101 Completion Date: 2/15/91

6. Ask the State Directors and the Directors of the Service Center, the Interagency Fire Center and the Training Center to designate field contacts.

   Lead: 101 Completion Date: 3/1/91

B. The following actions are recommended to develop a set of proposed long-term projects.

1. Organize proposed visit by the SLA reclamation delegation.

   Lead: IIS w/ 200 & 600 Completion Date: 10/1/90

2. Prepare proposed work plan for implementing BLM/SLA protocol.

   Lead: IIS w/ SDCO, DSC, & 700 Completion Date: 10/1/90

3. Prepare proposed work plan for further BLM participation in the NATO/CCMS pilot study on desertification.

   Lead: 220 w/ SDNM & IIS Completion Date: 10/1/90

4. Solicit additional projects proposals from the Field and from Washington Office program staffs, emphasizing projects that underscore the BLM's expertise in establishing and managing rights of usufruct, in managing for a variety of different and often competing uses, in restoring degraded and disturbed areas, and in providing technical services.

   Lead: IIS Completion Date: Ongoing

5. Identify potential opportunities for expanding cooperation with Canada, Mexico, and Central America.

   Lead: IIS Completion Date: Ongoing

6. Continue discussions with the Department of the Interior, the Department of State, the Agency for International Development, and the World Bank concerning the BLM's interest in and ability to provide technical assistance.

   Lead: IIS Completion Date: Ongoing

7. Develop a portfolio which describes the BLM and its ability to provide technical assistance.

   Lead: IIS with 130 Completion Date: 6/15/91

APPENDIX A

INTERNATIONAL ACTIVITIES
OF THE
BUREAU OF LAND MANAGEMENT
THROUGH FISCAL YEAR 1988

INTERNATIONAL ACTIVITIES

OF THE

BUREAU OF LAND MANAGEMENT

THROUGH FISCAL YEAR 1988

Late 1950's A BLM employee worked in Argentina and assisted in land office procedures, title processing, and land survey techniques. All costs were reimbursed to the Bureau by the Agency for International Development (AID).

1963 During a 90-day assignment, BLM personnel studied the feasibility of surveying and registering agricultural lands to ease economic and social problems in Morocco.

1965-68 BLM personnel provided technical assistance on cadastral surveying, land classification, and land use planning for agrarian reform in cooperation with Brazil's Instituto Brasileiro de Reforma Agraria. Project was financed through AID.

1967-68 The BLM evaluated land settlement projects in Brazil, Colombia, Bolivia, and Peru.

1965-70 BLM personnel worked in Nigeria. Among other things, they helped develop six grazing reserves and organized a range management curriculum at the Northern Nigeria Livestock Training Center.

1970-72 Under an agreement with AID, the BLM advised the Ethiopian Government on range management. This included conducting studies on grass ecology, carrying capacities and prospective range development projects; developing a training program for Ethiopian range project managers; and providing technical assistance to a regional livestock project conducted by the Ministry of Agriculture.

1975-80 Under an agreement between the U.S. and U.S.S.R., the BLM participated in site visits to review mine reclamation techniques in both the U.S. and the Soviet Union.

1976-79 BLM personnel were assigned to Saudi Arabia to provide technical assistance on cadastral survey, land use planning, and water resource and agricultural development. The assignment was coordinated through the Treasury Department and financed by Saudi Arabia.

1981-83 BLM personnel were assigned to Indonesia to help develop a system for surveying land and issuing title to properties. This work was performed under an agreement involving Indonesia, State Department and the BLM. All costs including salaries, travel, and per diem were reimbursed to the Bureau by AID.

1985 For five weeks, a BLM employee conducted fire training courses in South America. Salary and per diem were funded by the BLM and travel costs by AID.

1986 A BLM employee participated in a three week wildlife/forestry tour of China. Salary was funded by the BLM; the employee covered travel and per diem.

1987 A BLM employee provided technical assistance to a locust infestation spraying project in Chad. Africa - specifically to design a communication system. Salary was funded by the BLM and travel and per diem by the FS.

1988 A BLM employee assisted the Army in developing a communications system to provide for aircraft collision avoidance and aircraft tracking in Honduras. The Army provided all funding.

A BLM employee assisted the Chinese Ministry of Forestry in designing a microwave radio communication system and automatic weather forecasting and lightning detection systems. The BLM funded salary and per diem. The World Bank funded travel.

A BLM employee assisted in developing a communication network to facilitate eradication of grasshopper and locust infestation in Tunisia, Africa. Salary was funded by the BLM, travel and per diem by AID.

A BLM employee participated in cave expedition project in China. The BLM funded salary, travel and per diem.

APPENDIX B

RECENT AND PROSPECTIVE INTERNATIONAL ACTIVITIES OF THE BUREAU OF LAND MANAGEMENT

RECENT AND PROSPECTIVE
INTERNATIONAL ACTIVITIES
OF THE
BUREAU OF LAND MANAGEMENT[1]

PART I: SELECTED FISCAL YEAR 1989 ACTIVITIES

A. TRANSBOUNDARY ACTIVITIES

The BLM engaged in the following transboundary activities during Fiscal Year 1989:

FIELD OFFICES

ALASKA:

- Coordinated archeological site inventories and artifact analyses with Canadian scientists. This is part of an ongoing program focusing on artifacts recovered from Alaskan archeological sites on public lands.
  Contact: John P. Cook, AK060, FTS 474-2311.

- Participated in a joint U.S.-Canadian effort (including Alaska public lands information center and the Yukon territory government) to design and construct a information kiosk located at the Alcan highway.
  Contact: Dave Vickery, AK912, FTS 868-5555.

- Implemented fire suppression agreement with the Yukon territories of Canada for fire suppression ten miles inside their border.
  Contact: Dick O'Connell, AK310, FTS 870-5609.

- Exchanged lightning detection and other weather forecasting data with Canada.
  Contact: Dick O'Connell, AK310, FTS 870-5609.

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[1] This appendix was compiled from information the State Offices, the Boise Interagency Fire Center, and the Washington Office Divisions provided in response to Information Bulletin No. 90-485, dated July 9, 1990. Given the short turnaround requested for this information this compilation is undoubtedly incomplete.

BOISE INTERAGENCY FIRE CENTER:

- Involved in wildfire suppression activities with Canada. Activities included sending Mark III pump kits to Canada; processing fire orders; and forwarding Canadian requests for emergency assistance to the appropriate fire service.
  Contact: Skip Scott, FTS 554-2408.

MONTANA:

- Involved in the BLM assessment of the proposed Altamont Pipeline for transporting natural gas from Canada through Montana to Wyoming.
  Contact: Loren Glade, Miles City DO, (406) 232-4331.

WASHINGTON OFFICE DIVISIONS

FIRE AND AVIATION

- Exchanged information with Canada on a daily basis during the fire season.
  Contact: Lee Barkow, WO740, FTS 653-8800.

LANDS AND REALTY:

- Worked with the Alaska, California, Montana and Wyoming State Offices on major rights-of-way projects involving Canada.
  Contact: Ed Puchalla or Mark Etchart, FTS 208-5441.

WILDLIFE AND FISHERIES:

- Participated with Canada in data exchanges concerning the recovery of the grizzly bear, gray wolf and black-footed ferret.
  Contact: Bill Radtkey, WO240, FTS 653-9202.

- Participated in meetings of the Desert Fishes Council involving fish conservation in arid regions of the U.S. and Mexico.
  Contact: Jack Williams, WO240, FTS 653-9202.

B. EXCHANGES OF SCIENTIFIC AND TECHNICAL INFORMATION

In Fiscal Year 1989 the BLM participated in the following scientific and technical exchanges with other countries:

FIELD OFFICES

ALASKA:

- Briefed the Canadian Ministry of Energy, Mines and Resources and the Canadian Ministry of Indian and Northern Affairs on the Bureau's experiences in surveying large tracts of remote land.
  Contact: Robert Arndorfer, AK920, FTS 868-3193.

- Exchanged technical information with Canada related to fire suppression, i.e. smokejumper operations; air tankers operations; and fire retardants.
  Contact: Dick O'Connell, AK310, FTS 870-5609.

- Exchanged information with Scandinavian, Soviet, and Canadian representatives on coal resources in the Arctic, methods of mining coal and various environmental problems. Contact: Joseph Dygas, AK310, FTS 868-4403.

BOISE INTERAGENCY FIRE CENTER:

- Briefed Canadians on the use of fire foam, wildfire safety, the incident command system, and the initial attack management system.

- Hosted 48 formal visitors from Australia, Brazil, Chile, China, Korea, Pakistan, and the Soviet Union.

- Exchanged information with the Peoples' Republic of China about microwave communication systems and automatic lightning detection systems.
  Contact: Duane Herman, FTS 554-2480.

EASTERN STATES:

- Conducted tour of the General Land Office (GLO) records project for delegations from India, the Republic of Malaysia, and Radio Free Europe, emphasizing optical scanning, indexing and retrieval systems.
  Contact: Jim Gegen, GLO Project Manager, FTS 989-1356.

IDAHO:

- Briefed visiting Chinese scientists on rehabilitation and greenstripping projects research projects in the Snake River Birds of Prey Area.
  Contact: Mike Pellant, IDSO.

MONTANA:

- Participated in an international review of the classification and use of aridic soils sponsored by the Soil and Water Conservation Society. Canada, Egypt, and India were among the countries which participated.
  Contact: Clair Clark, Lewistown DO, (406) 538-7461.

NEW MEXICO:

- Participated in the organizational meeting for an international pilot study on desertification in developed areas sponsored by the North Atlantic Treaty Organization (NATO). Representatives from Spain, France, Iceland, Portugal, and Italy attended the proceedings held in Portugal.
  Contact: Larry Woodward, NMSO, FTS 476-6030.

OREGON:

- Exchanged information concerning the reclamation of uranium mines with scientists from Australia and the Soviet Union.

UTAH:

- Presented and published paper delivered at the International Federation of Surveyors in Helsinki, Finland on cadastral surveying. Representatives from over 61 countries attended.
  Contact: Donald Buhler, UTSO, FTS 581-4135.

WYOMING:

- Involved in scientific exchanges regarding the use of beavers to improve riparian areas and the use of siberian polecats as research surrogates in the captive breeding program for black-footed ferrets.
  Contact: Dave Roberts, FTS 329-6099.

- Developed a system of computer models for smoke management from prescribed fires. Information on this model has been requested from Germany, Czechoslovakia, and the Soviet Union.

- Hosted visitors from Africa, Asia, Australia, Europe.

- Exchanged information on livestock management, oil and gas development, and reclamation.
  Contact: Al Riebau, FTS 329-6095.

WASHINGTON OFFICE DIVISIONS

ENERGY AND MINERAL RESOURCES:

- Briefed the Canadian Ministry of Energy, Mines and Petroleum Resources of the Province of British Columbia on the Bureau's Energy and Resources program and the valuation methods used in the United States to determine fair market value for mineral claims that have been expropriated.
  Contact: Jean Juilland, WO680, FTS 268-4147.

- Presented information on the Federal Coal Management Program to a delegation from the Ministry of Energy of the Peoples' Republic of China.
  Contact: Walt Rewinski, WO650, FTS 268-4636.

- Provided information to fifteen countries concerning the Bureau's energy and mineral programs.

FIRE AND AVIATION MANAGEMENT:

- Co-sponsored an international fire management symposium attended by representatives of 40 countries.
  Contact: Lee Barkow, WO740, FTS 653-8800.

FORESTRY:

- Attended the 14th meeting of the United States/Japan Natural Resources (UNJR) Forestry Panel on forest and forest products.
  Contact: Mel Berg, WO230, FTS 653-8864.

- Exchanged data concerning forest tree improvement, silviculture, and forest insects and disease during sessions of the North American Forestry Commission (NAFC) with representatives from Canada, Mexico, and the United States.
  Contact: Mel Berg, WO230, FTS 653-8864.

PLANNING AND ENVIRONMENTAL COORDINATION:

- Exchanged information with Australia, Canada, People's Republic of China, and a variety of countries in Central and Western Europe.
  Contact: David Williams, WO760, FTS 653-8824.

RANGELAND RESOURCES:

- Participated in the International Grasslands Conference in France and the Global Warming Conference in Italy.
  Contact: C. Rex Cleary, WO220, FTS 653-9195.

- Presented a key note talk on ecological site inventory at conference in Kenya.
  Contact: Steve Leonard, WO220, FTS 953-9193.

C. TECHNICAL ASSISTANCE

In Fiscal Year 1989 the Bureau provided the following technical assistance to other countries:

FIELD OFFICES

ALASKA:

- Briefed Soviet delegation on how the BLM regulates oil and gas activities, manages interagency relationships, and handles public participation.
  Contact: Joseph Dygas, AK980, FTS 868-4403.

BOISE INTERAGENCY FIRE CENTER:

- Responds to over one hundred requests annually from foreign countries for technical assistance related to fire management. Wildfire prevention, smoke management, prescribed fire, fire investigation, remote sensing, and retardant systems are among the topics for which assistance is requested.

- Responded to a request from the Office of Foreign Disaster Assistance (OFDA) to provide Soviet officials with communication support following a train wreck and natural gas explosion.

- Sent communications support to Jamaica upon a request for assistance from the OFDA after the island was hit by Hurricane Gilbert.

WYOMING:

- Responded to requests for information from Czechoslovakia, Germany and the Soviet Union concerning the BLM's Simple Approach Smoke Estimation Models (SASEM).
  Contact: Al Riebau, FTS 329-6095

WASHINGTON OFFICE DIVISIONS

FORESTRY:

- Provided assistance to the development of a national forestry program in Pakistan.
  Contact: Mel Berg, WO230, FTS 653-8864.

WILDLIFE AND FISHERIES:

- Responded to request for technical data on desert fishes, migratory waterfowl, and endangered species to scientists in other countries.
  Contact: Jack Williams, WO240, FTS 653-9202.

PART II: ONGOING ACTIVITIES

A. INTERAGENCY COMMITTEES ASSOCIATED WITH INTERNATIONAL ACTIVITIES

In Fiscal Year 1989 the Bureau of Land Management's divisions and offices were involved in the following interagency committees associated with international activities:

ACID RAIN

National Atmospheric Deposition Program (NADP) Technical Committee: Addresses the atmospheric deposition (acid rain) issues both nationally and internationally. Coordination with Canada by collocated monitors is part of the program. The Wyoming State Office is an active participant.
Contact: Stan Coloff, WO220, FTS 653-9210.

DRUGS

American-Canadian Drug Conference (AC-DC), Alberta, Canada: Meets quarterly to assist in conducting multi-jurisdictional drug investigations within all levels of law enforcement.
Contact: William Duncan, FTS 588-7907.

ENDANGERED SPECIES

Interagency Grizzly Bear Recovery Committee: Meets annually or more frequently as necessary to work on recovery effort jointly signed by United States and British Columbia.
Contact: Jack Williams, WO240, FTS 653-9202.

FIRE MANAGEMENT

Canadian Committee on Forest Fire Management: Meets annually in Canada for coordination of resources and research and technology development.
Contact: Lee Barkow, WO740, FTS 653-8800.

Interior West Fire Council: Meets annually to exchange information and techniques on problems in fire management. Council includes Alberta, Saskatchewan, and Northwest Territories of Canada.
Contact: Walt Shopfer, FTS 588-7713 or Jerry Chapman, COM (406) 232-4331

National Wildfire Coordinating Group: Responsible for coordinating federal and state activities relating to fire management. This group has occasion to interact occasionally with other countries.
Contact: Lee Barkow, WO740, FTS 653-8800.

North American Forestry Commission, Fire Management Study Group: The Chief, Division of Fire and Aviation Management serves as a standing member. Committee meets annually.
Contact: Lee Barkow, WO740, FTS 653-8800

Northwest Forest Fire Council: Meets annually and focuses on interagency communication and coordination on fire management issues. Council is composed of representatives from private industry; universities; and federal, state, and provincial agencies from Alaska, British Columbia, Oregon, Washington, and Yukon.
Contact: Lee Barkow, WO740, FTS 653-8800.

FORESTRY

North American Forestry Commission (NAFC): The Chief of the Forestry Division (230) sits on this commission. There is also representation on the North American Forestry Commission Study Group on Silviculture.
Contact: Mel Berg, WO230, FTS 653-8864.

Tropical Forestry Task Force of the State Department.
Contact: Mel Berg, WO230, FTS 653-8864.

United States/ Japan Natural Resources (UJNR) Forestry Panel: An ongoing program to exchange forest and forest product information.
Contact: Mel Berg, WO230, FTS 653-8864.

United States Interagency on Tropical Forests: The Forestry Division sends representatives and participates in this organization.
Contact: Mel Berg, WO230, FTS 653-8864.

GLOBAL CHANGE

Committee on Earth Sciences (CES) of the Federal Coordinating Council for Science, Engineering and Technology: Coordinates United States' goals, implementation strategy, and research budget to address the issue of global change.
Contact: Stan Coloff, WO220, FTS 653-9210.

Department of the Interior Working Group on Global Change.
Contact: Stan Coloff, WO220, FTS 653-9210.

Department of the Interior Working Group on Mitigation and Adaptation Research Strategies.
Contact: Stan Coloff, WO220, FTS 653-9210.

POLAR

Department of the Interior Working Group of the Interagency Arctic Research Policy Committee.
Contact: John Haugh, WO709, FTS 653-9200.

Interagency Task Group to Assist the National Sciences Foundation in Drafting Pollution Control Regulations for the Antarctic.
Contact: Bernie Hyde, WO707, FTS 268-5517.

Polar Research Board of the National Academy of Sciences.
Contact: John Haugh, WO709, FTS 653-9200.

Working Group to Review The Convention on Regulations of Antarctic Mineral Resource Activities. Energy and Minerals participates in this group.
Contact: Daniel Dick, WO680, FTS 268-4147.

Working Group to Review and Update The Final Environmental Statement on the Negotiation of an International Regime for Antarctic Mineral Resources. Energy and Minerals participates in this group.
Contact: Brad Laubach, MMS 285-2220

B. CONFERENCES AND PROFESSIONAL MEETINGS

During Fiscal Year 89, personnel attended the following international conferences and professional meetings. Many of the conferences and meetings occur annually.

American Congress on Surveying and Mapping

Canadian Archeological Association

Canadian Committee on Forest and Fire Management

Desert Fishes Council

Federation of International Geography

Institute for Land Information

Interior West Fire Council

International Association of Fish and Wildlife Agencies

International Federation of Surveyors

International Grasslands Conference

International Right-Of-Way Meetings

International Society for Photogrammetry and Remote Sensing

International Soil Correlation Meetings (ISCOM) organized by the Soil Management Support Services and the United States Agency for International Development (USAID)

International Symposium on Meeting Global Wildlife Challenges

International Wild Fire Conference

Northwest Fire Council

Society for Range Management, Canada.

Society of Vertebrate Paleontology, Alberta, Canada

PART III. PROPOSED AND UPCOMING INTERNATIONAL ACTIVITIES

The BLM Field office and Washington office divisions identified the following proposed and ongoing international activities.

FIELD OFFICES

ALASKA:

- Drafting a memorandum of agreement with the Canadian Ministry of Surveys, Mapping and Remote Sensing to develop a modern integrated survey system.
  Contact: Robert Arndorfer, AK920, FTS 868-3193.

- Continuing a research program with Siberian archaeologists on obsidian hydration dating.
  Contact: John Cook, AK060, FTS 474-2311.

- Anticipating exchanges with the U.S.S.R. concerning oilfield and pipeline operations in the Arctic.
  Contact: Joseph Dygas, AK980, 868-4403.

BOISE INTERAGENCY FIRE CENTER

- Continuing support to foreign countries via requests from OFDA, USAID, and orders in support of the Canadian and United States wildfire support agreement.

IDAHO:

- Exchanging information with Canadian provinces on Idaho's greenstripping and rehabilitation research program.

- Presenting a paper on greenstripping at the IV International Rangeland Congress in Montpelier, France.

- Participating in a proposed plant collection/information exchange trip with the Soviet Union.
  Contact: Mike Pellant, IDSO.

MONTANA:

- Working with scientists in the Soviet Union to identify biological control agents for noxious weeds.
  Contact: Hank McNeel, MTSO, FTS 588-7931.

- Developing a cooperative agreement with the Provinces of Alberta and Saskatchewan, Canada to cover fires that burn across the two borders.
  Contact: Walt Schopfer, MTSO, FTS 588-7713.

OREGON:

- Presenting paper on riparian restoration and fish habitat improvement at the International Fisheries Society meeting in Athens, Greece.
  Contact: Wayne Elmore, Oregon Riparian Coordinator.

WYOMING:

- Presenting a paper on the use of microcomputers in managing wilderness areas at the upcoming international conference "Resource Technology 90" to be held at Georgetown University, Washington DC.
  Contact: Al Riebau, FTS 329-6095.

- Presenting a paper on new LIS technologies at the upcoming international conference "Resource Technology 90" to be held at Georgetown University, Washington DC.
  Contact: Bruce Keating, FTS 329-6245.

WASHINGTON OFFICE DIVISIONS

CADASTRAL SURVEY:

- Participating in the 1990 International Federation of Surveyors (FIS) conference in Finland.

- Cooperating with Canada on development of GPS-inertial system.

- Participating in Surveying and Mapping Teachers conference.

- Participating in the Atlantic Institute.
  Contact: Gary Speight, FTS 653-8798.

ENERGY AND MINERALS:

- Participating in an Energy and Mineral Resources delegation visiting the Soviet Union in the fall of 1990.
  Contact: Jean Juilland, WO680, FTS 268-4147.

FIRE AND AVIATION MANAGEMENT:

- Helping to organize a Latin American Fire Prevention Conference.

- Preparing a tri-partite memorandum of understanding between Mexico, Canada, and the U.S. to facilitate hemisphere mobilization of fire management resources.

- Encouraging the Food and Agriculture Organization (FAO) of the United Nations to update, reprint and distribute the FAO Fire Glossary.
  Contact: Lee Barkow, WO740, FTS 653-8800.

FORESTRY:

- Attending the 1990 UJNR meeting in Japan.
  Contact: Mel Berg, WO230, FTS 653-8864.

- Participating in the 1991 North American Forestry Commission silviculture meeting in Mexico to revise a publication on tropical trees in North America.
  Contact: Dennis Williamson, WO230, FTS 653-8864.

PLANNING AND ENVIRONMENTAL COORDINATION

- Continuing to work with the Canadian Government on refining cumulative impact assessment procedures.

- Continuing to exchange planning and environmental impact assessment information with the governments of Australia, China, and New Zealand.
  Contact: David Williams, WO760, FTS 653-8824.

RANGELAND RESOURCES:

- Continuing to participate in the NATO/CCMS pilot study on desertification.
  Contact: Don Waite, WO220, FTS 653-9210.

- Continuing to work with the Soviet Union on the joint U.S./U.S.S.R. Global Change Research Proposal.
  Contact: Stan Coloff, WO220, FTS 653-9210.

WILDLIFE AND FISHERIES:

- Continuing participation of staff in the international symposium of rare fish. Co-sponsorship of upcoming World Fisheries Congress to be held in Athens, Greece.
  Contact: Jack Williams, WO240, FTS 653-9202

APPENDIX C

CONGRESSIONAL RESEARCH SERVICE ISSUE BRIEF

INTERNATIONAL ENVIRONMENT:

OVERVIEW OF MAJOR ISSUES

UPDATED MAY 25, 1990

Order Code IB89057

CRS Issue Brief

International Environment: Overview of Major Issues

Updated May 25, 1990

by
Mary Tiemann and Susan R. Fletcher
Environment and Natural Resources Policy Division

CRS

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International Environment: Overview of Major Issues

SUMMARY

The international nature of many environmental problems has become a major focus of attention in recent years. Scientific data indicate that transboundary movement of pollutants poses an increasing threat to global ecosystems, thus making all nations potentially subject to negative economic, social, and health impacts from environmental degradation originating beyond their borders. Many issues are interconnected (e.g., tropical deforestation may exacerbate global warming and species loss), and some proposed solutions may compound other problems (e.g., controlling sulfur emissions may increase carbon dioxide emissions). Moreover, continuing high levels of population growth intensify most of these problems.

The July 1989 Economic Summit in Paris of the heads of state from the seven major industrial nations ("G-7") and the President of the Commission of the European Communities placed strong emphasis on environmental issues, which are the focus of one-third of the final Declaration. A brief summary of the environmental provisions this Declaration is provided below, followed by individual issue summaries. The issues described are chosen because of the level of attention and concern given them currently by the scientific community and policymakers. Issues included are: global climate change, depletion of stratospheric ozone, acid rain, international waste transport, marine pollution, tropical deforestation, loss of biological diversity, environmentally sustainable development, and preservation of the Antarctic.

Congress has enacted environmental protection legislation to address both domestic and international concerns in several of these issue areas. Increasingly, it has been searching for ways to address more comprehensively the international implications of environmental degradation, both through unilateral action and through promotion of international action. Actions in the 100th Congress included ratification of two international environmental protection protocols as well as consideration of proposals to amend existing environmental protection and foreign assistance statutes. In the 101st Congress, numerous bills have been introduced that refine or build on earlier proposals. The Senate hosted an Interparliamentary Conference on the Global Environment Apr. 30-May 2, 1990, that brought together over 200 participants from nations around the world. The Conference resolutions were grouped in seven categories: global climate change; stratospheric ozone depletion; deforestation and desertification; biological diversity; population growth; oceans and water resources; and sustainable development. A follow-up conference is scheduled by the Czech government in Prague, next spring.

ISSUE DEFINITION

International environmental concerns involve a wide variety of issues that begin with domestic actions or activities and involve transboundary or global impacts on citizens of other countries. Emissions of gases that increase the "greenhouse effect" that may cause climate change, for example, originate from burning of fossil fuels and forests, as well as from other industrial and agricultural processes. Over the past several years, public attention has centered on threats to global ecosystems and loss of "life support" processes of natural systems as they are threatened by human activity. Concerns in several of the more prominent issue areas are summarized below. Two underlying issues are (1) how can the United States take action domestically to address international concerns and to take a leadership and exemplary role in dealing with its own environmental processes, and (2) what measures are appropriate to influence and assist other countries to deal with these issues.

BACKGROUND AND ANALYSIS

Economic Summit: Environmental Provisions

Environmental issues have increasingly been in the headlines during the past few years, and the international dimensions of these issues have been of growing importance. Consequently, the environment is becoming significant component of international policy deliberations. (See CRS Issue Brief 89151, The Environment as a Foreign Policy Issue.) In July 1989, the heads of State from the seven major industrial nations (G-7) and the President of the Commission of the European Community met to discuss economic issues. For the first time, the environment was a major agenda item.

Summit participants noted the growing awareness of serious threats to the atmosphere; pollution of air, rivers, and oceans; acid rain; rapid decertification; and deforestation; and called for decisive action "to understand and protect the earth's ecological balance."

The G-7 Declaration identified global environmental protection and the worldwide adoption of policies based on sustainable development as one of the three "main challenges" facing the world economic situation. Among its provisions, the Summit Declaration urged all countries to conduct scientific research and evaluate economic costs and benefits of environmental policies, noting that cost-benefit analyses should reflect the full value of natural resources; called for the World Bank, regional development banks, OECD and the United Nations to develop techniques to integrate environmental considerations into their activities; urged countries to combine their efforts to improve environmental observation and monitoring on a global scale; identified measures to help developing countries deal with past damage and take environmentally desirable action, including: use of aid, technology transfer, debt forgiveness, and debt-for-nature swaps; emphasized the urgency of preserving tropical forests, both in terms of implications for the greenhouse effect and for purposes of sustainable development and protection of habitat for biological diversity;

expressed support for the Tropical Forest Action Plan of the U.N. Food and Agricultural Organization (FAO) and the International Tropical Timber Organization; and urged protection of temperate forests from acid precipitation through both bilateral and multilateral efforts; called for a "framework or umbrella convention on climate change," with acknowledgement of the work of the U.N. Environment Programme (UNEP) and the World Meteorological Organization; condemned dumping of polluting waste into the oceans; called for a U.N. report on the state of the world's oceans; and advocated strengthening existing environmental institutions within the United Nations, in particular stronger financial support for UNEP.

Global Climate Change

A number of gases produced by human activity have been measured at increasing concentrations, adding to the 'greenhouse' effect in which the atmosphere traps heat from the sun. The major greenhouse gases are carbon dioxide, nitrous oxide, methane, and CFCs. Fossil fuel combustion is a major source of carbon dioxide and nitrous oxide. These increases in gas concentrations are projected by some climate modelers to cause increases in the earth's temperature of several degrees during the next century. The exact pace and amount of such warming is unknown, as are precise regional distributions; effects on climate cannot be precisely predicted because a number of complex feedback mechanisms, such as increased cloud cover, may mitigate changes. Impacts of climate change could include rising sea levels, changing "life zones" for plants and animals, decreasing crop production in many areas, changing drought patterns, and increasing temperatures in many areas.

International Action: International meetings have convened under the auspices of the United Nations Environment Program (UNEP) to work toward a framework convention to address global warming. An International Panel on Climate Change (IPCC) has been formed to coordinate a major assessment of the magnitude, timing, impacts and possible responses to projected climate warming. At UNEP's Governing Council meeting in May 1989, the 103 countries attending agreed to begin negotiations next year on an international treaty on climate change. A Ministerial Conference on Atmospheric Pollution and Climatic Change in Noordwijk, Netherlands, in the fall of 1989 was attended by 71 nations, including the United States. It resulted in a 9-page Declaration urging all nations to take actions to limit climate change. The United States, Japan, and the U.S.S.R. made headlines by opposing inclusion of specific timetables for stabilization and reduction of carbon dioxide emissions, arguing that impacts of such actions are not sufficiently understood. The Declaration states that the industrial nations agreed such stabilization should be achieved as soon as possible. An IPCC report will be published in Fall 1990.

Legislation: The 100th Congress enacted the Global Climate Protection Act as Title XI of H.R. 1777 of P.L. 100-204, which required development of a coordinated national policy on global climate protection, as well as other measures for coordination, research and international cooperation. In the 101st Congress, a number of comprehensive bills to address global warming have been introduced. They include a wide array of research, domestic energy policy, foreign assistance, transportation policy, and tropical forest protection measures. These include H.R. 980 (Jones, W.), H.R. 1078 (Schneider), S. 169 (Hollings), S. 201 (Gore), S. 251

(Moynihan), S. 324 (Wirth), S. 333 (Leahy), S. 603 (Boschwitz) and S. 676 (Baucus), S. 1610 and S. 1611 (Leahy), S.J.Res. 88 (Wirth), and H.J.Res. 207 (Fazio).

(For more information, see CRS Issue Brief 89005, Global Climate Change.)

Ozone Depletion

Ozone in the upper atmosphere is being depleted by the action of chlorofluorocarbons (CFCs), which are man-made substances used as chemical solvents and cooling agents for air conditioning and for manufacturing foam products, including styrofoam. As stratospheric ozone is depleted, larger amounts of ultraviolet radiation reach the Earth's surface, with projected harmful effects on human health (increased skin cancer, immune system disorders, etc.), and terrestrial and aquatic vegetation (decreased plant productivity). Dramatic ozone depletion was first noticed in 1985 over Antarctica, and varying degrees of depletion have been measured over most latitudes.

International Action:

-- 1985: Vienna Convention signed, setting framework for negotiation of a protocol to protect the ozone layer;

-- 1987: Montreal Protocol signed, agreeing to freeze world consumption of CFCs at 1986 levels, and reduce consumption 50% by 1999; 31 nations have signed, 11 have ratified; entered into force January 1, 1989;

-- May 1989: Reflecting concern over recent evidence that ozone depletion is faster than had been expected, and that CFCs are also greenhouse gases, parties to the Vienna Convention and Montreal Protocol agreed in principle to phase out production and consumption of CFCs as soon as possible, but not later than 2000; and to phase out or reduce other ozone-depleting substances as soon as feasible. Assistance to developing countries is to be sought, along with access for them to relevant scientific information, research and training.

Legislation: A number of comprehensive bills have been introduced to address both ozone depletion and global warming; these include S. 201 (Gore), S. 333 (Leahy), S. 676 (Baucus), and H.R. 1078 (Schneider). Other bills directed specifically at controlling ozone depleting substances, including measures such as accelerated phase-down and taxes to discourage use, include H.R. 1112 (Stark), S. 55 (Wilson), S. 333 (Leahy and Jeffords), S. 491 (Chafee), S. 644 (McCain), S. 870 (Gore), S. 871 (Gore), and S. 872 (Gore).

The final budget reconciliation package for FY1990 included a CFC tax starting in 1990. S. 491 as amended has been attached to S. 1630, the Clean Air Act amendments. CFC regulation and phaseout provisions were also added to H.R. 3030 in the House. These clean air bills are now in conference committee. (For more information, see CRS Issue Brief 89021, Stratospheric Ozone Depletion: Regulatory Issues.)

Acid Deposition

Caused primarily by atmospheric moisture reacting with sulfur dioxide and nitrogen oxides produced by fossil fuel combustion (primarily from coal-fired power plants, automobiles, and oil refineries), acid precipitation can damage lake and forest ecosystems, crops, and buildings. This is a contentious international issue, particularly among European nations and between the United States and Canada, where forests and lakes are widely vulnerable to damage.

The Clean Air Act in its present form does not explicitly address acid rain. Congress has debated the issue for more than 10 years without reaching agreement on how to reduce emissions or allocate reduction costs. Departing from past Administration policy, the Bush Administration offered a comprehensive clean air proposal that included acid rain controls in June 1989.

International Action: In November 1988, 24 nations including the United States signed a nitrogen oxides (NO_X) protocol under the Long-Range Transboundary Air Pollution (LRTAP) Convention. Under this treaty, participating nations will freeze NO_X emissions at 1987, or "any previous year," levels for the next 7 years. The United States and several other nations have acceded to or ratified this protocol.

Legislation: The House and Senate each passed clean air bills (H.R. 3030 and S. 1630) containing acid rain provisions. The Senate bill includes provisions to monitor Canada's compliance with, and the impacts of, its acid rain control program. The House bill establishes a U.S.-Mexico air quality office within EPA and creates a program to monitor and improve border air quality. Conference committee deliberations are expected be extensive. (For more information, see CRS Issue Brief 87045, Acid Rain: Issues in the 101st Congress.)

International Transport and Disposal of Solid and Hazardous Wastes

Strict new U.S. domestic regulation of solid and hazardous waste disposal are raising the costs and limiting the options available to industry and municipalities for disposing of these wastes. The less costly option of exporting wastes to countries with weaker (or nonexistent) environmental standards is becoming an increasingly attractive solution for waste managers in the United States and abroad. Congress imposed limited control over the export of hazardous wastes through the Hazardous and Solid Waste Amendments of 1984 (P.L. 98-616). Provisions require U.S. hazardous waste exporters to notify the importing country's government and receive prior informed consent before exporting.

Although roughly 90% of U.S. hazardous waste exports go to Canada for treatment and disposal, the number of notices of intent to ship hazardous wastes to developing countries for disposal without treatment has grown rapidly in recent years. (The EPA reports, however, that none of these notices has been approved by the intended recipient governments.) In 1988, incidents of uncontrolled hazardous waste dumping by European companies in developing countries resulted in international demand for stronger controls over international waste transport.

Current Federal control over hazardous waste exports has been criticized as having major gaps. Primarily, once a foreign government consents to receive waste, no provisions exist for monitoring the waste's final disposal. Nor does the U.S. Government give consideration to the recipient nation's ability to control the use or disposal of the accepted waste. Moreover, the export of solid waste -- including incinerator ash -- remains unregulated.

International Action: The United States participated actively in developing the United Nations-sponsored Basel Convention on the Control of the Transboundary Movement of Hazardous Wastes and Their Disposal, which was agreed to by 116 countries in March 1989. The treaty will enter into force after ratification by 20 countries; three have ratified. The United States signed the Basel Convention Mar. 22, 1990, to bring the number of signatures to 54. The Administration is soon expected to submit a legislative proposal strengthening Federal control over waste exports and implementing the treaty.

Legislation: The 100th Congress considered, but did not pass, several bills proposing to tighten Federal control over both solid and hazardous waste exports. Similar legislation, H.R. 2525 (Synar), H.R. 3736 (Luken), and S. 1113 (Baucus) has been introduced in the 101st Congress. H.Con.Res. 88 (Clinger) urges the President to sign the Basel Convention and submit it to the Senate for ratification.

Marine Pollution

Pollution originating in foreign nations or from a multitude of maritime activities can be carried great distances by circulating ocean currents. Despite several decades' experience with international marine protection treaties, the deterioration of the marine environment, particularly coastal waters, remains severe worldwide. The contamination of seafood and loss of fishing grounds increasingly results in economic losses, while the pollution of beaches leads to recreational and associated commercial losses. Pollution from oil spills was among the first marine pollution issues to be addressed through an international convention; and recent severe oil spills -- especially in Alaska's Prince William Sound -- have again made this concern a high priority.

International Action: The awareness that nations are environmentally interconnected may have first occurred in the area of marine pollution, where the first international treaty was signed in 1954. The major treaty addressing ocean pollution is the International Convention for the Prevention of Pollution from Ships 1973 (MARPOL 73/78). MARPOL 73/78 addresses pollution from several sources including oil (Annex I), and sewage and garbage (Annex IV).

The United States is signatory to several international marine pollution control agreements, including the International Convention for the Prevention of Pollution of the Sea by Oil, and the London Dumping Convention, which is implemented through the 1972 Marine Protection, Research, and Sanctuaries Act (P.L. 92-532, commonly called the Ocean Dumping Act). This law bans the intentional ocean dumping of several categories of waste including high-level radioactive wastes and chemical warfare agents.

Legislation: The 100th Congress enacted several pieces of legislation aimed at further reducing ocean pollution. New legislation banned all ocean dumping of sewage sludge (Title I, P.L. 100-688). Also, the Senate approved Annex V of MARPOL 73/78 (Treaty Doc. 100-3) which prohibited the ocean disposal of plastics from vessels as of Dec. 29, 1988. Companion legislation, P.L. 100-220, included provisions (Title II) to implement the international agreement and to ban plastic disposal out to the 200-mile limit, as well as provisions (Title IV) designed to reduce the amount of lost or abandoned drift gillnetting, which kills marine birds, fish, and mammals.

At the end of the first session of the 101st Congress, comprehensive oil pollution liability and compensation bills passed the House (H.R. 1465) and the Senate (S. 686); the bills remain in conference committee at this time. The House bill includes provisions to implement two international oil spill conventions should the Senate give its advice and consent and the President ratifies them. (For more information, see CRS Issue Brief 89082, Oil Pollution Liability and Compensation Legislation After the Exxon Valdez Oil Spill; and CRS Report 88-377 ENR, Marine Plastics Pollution Control Legislation.)

Tropical Deforestation

Tropical forests are being burned and cleared at a rapid rate around the world. These forests are found in a belt around the equator, with the largest remaining concentrations in Southeast Asia (especially Indonesia), Africa (especially Zaire), and in Latin America's Amazon Basin (especially Brazil). World attention has been focused especially on Brazil because it contains some 30% to 40% of the total remaining tropical rainforest. Concerns over loss of these forests are longstanding, reflecting increasing distress over the loss of biological diversity of these unique and rich habitats, and the unsustainability of much of the development that replaces the forest. Recently, major concerns have been raised that burning these forests contributes substantially to the greenhouse effect and possible climate change. The burning of these forests may contribute as much as 20% to 25% of the world's total annual emissions of carbon dioxide. About 50,000 square kilometers of forest were burned in 1988, just in Brazil, although the rate of burning in that country was somewhat less in 1989 due to both greater rainfall in the dry season and new regulation of burning by the Brazilian government. Other countries are also losing their forests at rapid rates. (The United States has only a small amount of tropical forest in Puerto Rico and Hawaii.)

International Action: The International Tropical Timber Agreement was completed in 1983. Producing and consuming nations agreed to establish the International Tropical Timber Organization (ITTO) to promote international cooperation, coordinate statistical data, and support research and development on utilization, reforestation, and marketing involving tropical forests. There are 36 producing members and 33 consuming members of the ITTO, which began functioning in 1986. Although its major interest is in tropical forest products and trade, the ITTO has recently begun to pay more attention to sustainable forest management.

The Tropical Forest Action Plan (TFAP), completed in 1985, was prepared by the U.N. Food and Agriculture Organization (FAO) in cooperation with the World Resources Institute, the World Bank and UNEP. It describes the basic elements that nations can use "to conserve and develop tropical forest resources on a long-term sustainable basis." With financial and technical assistance from bilateral and multilateral donors, some 67 countries are in various stages of developing forestry sector inventories and/or strategies utilizing the TFAP. Recent criticisms have emerged from nongovernmental organizations that TFAP may have the effect of increasing support of timber extraction and deforestation in some countries, and they urge closer monitoring of the TFAP process.

Legislation: The Foreign Operations, Export Financing and Related Programs Appropriations Act, 1990 (P.L. 101-167), passed at the end of the first session of the 101st Congress, contains several provisions on tropical forestry. Section 533 establishes it as U.S. policy that sustainable economic growth be predicated on sustainable management of natural resources, and among other things, directs AID to devote at least 10% of resources allocated for forestry activities to preservation of natural forests, and take related actions. Debt-for-nature swaps are to be encouraged. Section 534 specifies measures for Tropical Forestry Initiatives, including a mandate to focus tropical forestry assistance on key middle- and low-income countries that contribute large amounts of greenhouse gases due to tropical forest destruction.

Many of the comprehensive bills mentioned above under global climate change include provisions for protecting tropical forests. Others include H.R. 1704 (Porter) which encourages debt-for-nature swaps; H.R. 2065 (Vento), which encourages the U.S. Forest Service to carry out research in Puerto Rico and assist developing countries; H.R. 2782 (Stark), which relates to trade and tropical timber management; H.R. 3362 (Scheuer), which establishes global forest protection and restoration as a national priority; H.Con.Res 44 (Bates), which encourages lenders to reduce the debt burden of nations agreeing to protect their rainforests; H.J.Res. 431 (Wolf), which supports conservation efforts of Brazil to protect the Amazon forest; S. 1611 (Leahy) to strengthen U.S. foreign assistance efforts in tropical forestry (most of this bill was passed in P.L. 101-167); S.J.Res. 101 (Chafee), which supports efforts of Brazil to protect the Amazon; and S.J.Res. 125 (Reid)/H.J.Res. 271 (Schneider), which support assistance for tropical forest protection in developing countries including an agreement with Brazil. S. 2386 (Daschle), the National Agricultural Research, Extension, and Teaching Policy Act of 1990, includes in Title V extensive tropical forest provisions.

(For more information, see CRS Issue Brief 89010, Tropical Deforestation: International Implications, and CRS Report 88-647 ENR, Debt for Nature Swap in Developing Countries.)

Biological Diversity

Loss of biological diversity due to extinction of species when their habitat is lost or they are over-exploited, has been a longstanding concern. These losses are largely uncounted, since only 1.5 million of the 30 million species estimated to inhabit the earth have been identified or studied. However, it is estimated that if tropical forests, which harbor some of the richest diversity of species, are destroyed at current rates, some 15% of all plant species will be eliminated by the year 2000.

International Action: Major treaties are in effect including the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), signed by the United States Mar. 3, 1973, which prohibits or controls trade of species facing extinction; and the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention) signed in October 1940. These accords have been of limited effectiveness, as they focus on protecting species already suffering major reductions in population. Recent biodiversity protection efforts reflect the understanding that in order for a species to survive, its habitat must be preserved.

Negotiations are underway under auspices of the International Union for Conservation of Nature and Natural Resources (IUCN) to draft an international convention on biological diversity that would deal with protection of habitat.

Legislation: H.R. 1268 (Scheuer), on conservation of biological diversity as a national priority, would establish mechanisms for implementing such a policy; S. 261 (Moynihan), to amend the Trade Act of 1974 would strengthen effectiveness of international agreements protecting threatened or endangered species.

Environmentally Sustainable Development and U.S. Foreign Assistance

Over the past several years, Congress has taken a growing interest in assuring that foreign economic development assistance undertaken by the United States through AID or the multilateral development banks (MDBs) should be environmentally sustainable -- that is, it should not damage the environment or the natural resource base on which future development depends. Priorities have been given to energy efficiency and research to counteract the greenhouse effect, along with lending and assistance for mass transportation and transportation efficiency; pesticide alternatives; pilot projects for converting debt into conservation measures; environmental structural adjustment lending; sustainable agricultural development, including agroforestry (use of trees to conserve soils and productivity); and other measures.

International Action: As discussions continue in international conferences and in the International Panel on Climate Change (IPCC), sustainability of various methods of economic development in both the developed and developing world is a major topic. In 1987, the United Nations World Commission on Environment and Development (WCED) released its report, *Our Common Future*, which stressed sustainability as an underlying requirement both in developed and developing countries, and discussed the meaning of this term in critical sectors such as agriculture, energy, industry, and areas such as population. In 1989 the United Nations General Assembly decided that a major world conference on environment and development will be held in Brazil in 1992 to herald the 20th anniversary of the Stockholm Conference on the Human Environment.

Legislation: In the 101st Congress, several measures relevant to environmentally sustainable development have been passed. These include the Foreign Operations, Export Financing, and Related Appropriations Act for Fiscal year 1990 (P.L. 101-167), which includes requirements for promotion in the Multilateral Development Banks by the United States of energy efficiency and use of renewable resources, environmental impact studies, and other measures. The International Development and Finance Act of 1989 (P.L. 101-240) requires that support for sustainable development and conservation projects be included in negotiations for exchanges of foreign countries' debt; provides guidance to U.S. Executive Directors on promotion of environmental objectives in their respective MDBs, including creation in each MDB of a department of environmental protection, environmental guidelines, promotion of debt-for-nature exchanges, and other provisions; and requires that 2 years after enactment, U.S. Executive Directors should not vote in favor of any action proposed by an MDB which would have significant impacts on the environment, unless an environmental impact assessment meeting specified criteria is made available to directors.

Preservation of the Antarctic

Human activity in Antarctica has increased significantly over the past decade, with resulting concern over the impact of such activities on the environment. Major concerns have been raised over the operation of the scientific research stations funded by the National Science Foundation, and the Environmental Protection Agency has urged that it have an expanded role in issuing permits for such activity in order to control pollution. Immediate concerns have been raised by the signing of a Minerals Regime in 1988, setting forth the conditions under which any future minerals exploration and development would take place. While environmental protection is a major objective of such conditions, the failure of the voluntary compliance system under the Antarctic Treaty to resolve concerns over pollution levels raises questions about implementation of protective measures under the Minerals Regime. Environmental groups argue that the only acceptable treaty would totally prohibit minerals exploration. Australia, France, and New Zealand have decided not to sign the Minerals Regime; their decision would prevent the minerals treaty from going into effect.

International Action: Treaties in effect include the Antarctic Treaty (entered into force in 1961) which establishes a framework for international cooperation for research in Antarctica, and suspends all territorial claims there (a large number of specific agreed measures have been signed under this treaty); the Convention on Conservation of Antarctic Marine Living Resources (CCAMLR) (entered into force in 1982), dealing with protection of ecosystems and species not protected under other conventions; and the 1972 Convention on the Conservation of Antarctic Seals (entered into force in 1978). The Convention on the Regulation of Antarctic Mineral

Resource Activities (CRAMRA) (also known as the Minerals Regime, or the Wellington Convention) was signed in Wellington, New Zealand, on June 2, 1988. The U.S. Senate is unlikely to consider ratification in this Congress, but if it is ratified, implementation legislation will be debated in both Chambers of Congress.

Legislation: Several resolutions have been introduced to protect Antarctica, some specifying the area as a global ecological commons or World Park. These include H.J.Res.415 (Neal), H.J.Res. 418 (Owens), S.Res.186 (Helms), S.J.Res. 206 (Gore).

(For more information, see CRS Report 89-272 ENR, Antarctica: Environmental Protection Issues.)

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20, 1987) and Ballagio (Nov. 9-13, 1987), under the auspices of the Beijer Institute, Stockholm. World Meteorological Organization, 1988. 53 p.

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OTA-F-330

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U.S. Library of Congress. Congressional Research Service. Debt-for-nature swap in developing countries, by Betsy Cody. [Washington] Sept. 26, 1988. 34 p.
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----- Environmental activities of selected international organizations, by Wendy Woods and Betsy A. Cody. [Washington] Dec. 15, 1989. 50 p.
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----- National climate program: background and implementation, by John R. Justus and Robert E. Morrison. [Washington] Mar. 31, 1988. 72 p.
CRS Report 88-289 SPR

World Commission on Environment and Development. Our common future [widely known as the Brundtland Commission Report]. Oxford, Oxford University Press, 1987. 400 p.

World Resources Institute. World resources 1988-89: an assessment of the resource base that supports the global economy, with data tables for 146 countries. New York, Basic Books, 1988. 372 p. (Prepared in collaboration with the United Nations Environment Programme)

APPENDIX D

PROPOSED PROTOCOL
WITH THE
STATE LAND ADMINISTRATION

PROTOCOL

ON COOPERATION AND EXCHANGE

IN THE FIELDS OF LAND USE PLANNING AND LAND INFORMATION SYSTEMS
BETWEEN
THE DEPARTMENT OF THE INTERIOR OF THE UNITED STATES OF AMERICA
AND
THE STATE LANDS ADMINISTRATION OF THE PEOPLE'S REPUBLIC OF CHINA

The Department of the Interior of the United States of America, through its Bureau of Land Management, and the State Lands Administration of the People's Republic of China (hereinafter referred to as the Parties), for the purpose of promoting cooperation and the exchange of information - in the fields of land use [resource management] planning and [automated] land information systems being developed by the Parties - under the Agreement between the United States of America and the Government of the People's Republic of China on Cooperation in Science and Technology signed at Washington on January 31, 1979, and extended on January 12, 1984, agree as follows:

Article 1

The Parties agree to carry out cooperation and exchanges under this Protocol on the basis of equality, reciprocity and mutual benefit.

Article 2

The Parties confirm and agree that the areas of cooperation and exchanges under this Protocol may include:

1. Land use planning, called resource management planning in the U.S. Bureau of Land Management, including preparation, adoption, use, monitoring and change of plans.

2. Automated land information systems, including geographic coordinate data base, land status records, and automated resource data, linked through a geographic information system.

Article 3

The Parties agree that cooperation and exchanges under this Protocol may take the following forms:

1. Exchanges of delegations of managers and study teams.

2. Exchanges of scientific and technical materials, publications and other documentation.

ROUGH WORKING DRAFT, prepared 8/17/88 (updated 3/21/89) by David Williams, BLM Chief of Planning. This draft has not been reviewed by the BLM Directorate, the Solicitor, the Assistant Secretary, or the State Department. It is NOT to be taken as an official or even semi-official BLM/Interior proposal.

3. Exchanges of specialists and trainees between the two Parties for extended periods of time, and their attendence at professional courses of the other country.

4. Opportunity for students in the other Party's schools to intern with that Party's agency during school breaks;

5. Joint research projects, and other forms of cooperative research as may be mutually agreed; and

6. Cooperation in the holding of symposis, courses, conferences, seminars and workshops, and participation in appropriate international symposia, courses, conferences, seminars and workshops to disseminate the results of this mutual effort.

Article 4

All cooperation and exchanges under this Protocol shall be subject to the laws and regulations of the respective countries.

Article 5

The Parties respectively will designate coordinators from the Bureau of Land Management of the Department of the Interior of the U.S.A., and the Ministry of Foreign Affairs of the State Lands Administration of the P.R.C. as their Executive Agents to administer activities conducted under this Protocol. The Parties will coordinate the participation of other government agencies, universities, organizations and individuals in both countries in the cooperation and exchanges set forth in Articles 2 and 3 of this Protocol.

Article 6

The Executive Agents of both Parties will discuss and decide annually the programs of cooperation and exchange, number of persons, duration and dates of implementation, and other related matters. If necessary, meetings may be held as mutually agreed upon to consult on matters related to the implementation of this Protocol. The Directors (or their representatives) will meet regularly to oversee progress of the Protocol, alternating meetings between the People's Republic of China and the United States of America.

Article 7

On the basis of mutual benefit, each Party shall provide the other with the scientific and technical materials, publications and other documentation as set forth in Article 3 of this Protocol. Each Party will send delegations, study teams and individuals to the other country, as set forth in Article 3 of this Protocol,for whom the sending Party will pay the cost of international travel and the host Party will cover in-country expenses.

The number of participants and the duration of their stay (i.e., in work-months) should come out approximately equivalent in the long run. Under special circumstances, the Parties may agree on other arrangements. All cooperative agreements under this Protocol shall be subject to the availability of funds and personnel.

Article 8

The specific cooperation and exchanges as mutually agreed and the plans under which they will be conducted, including financial responsibility, shall be embodied as Annexes to this Protocol. Annexes shall be consistent with the terms of this Protocol.

Article 9

Scientific and technical information derived from the cooperative activity under this Protocol shall be made available upon request to the World's scientific community through customary channels and in accordance with normal practice. With regard to exchanges of technical data or propritary information between the Parties, any conditions or limitations placed upon further dissemination of such data or information by the providing Party shall be respected by the receiving Party. If any scientific or technical results derived from a cooperative activity under this Protocol are the subject of a patent or patent application, both Parties shall jointly hold all the rights to all inventions claimed hereunder in their own territories and/or in third countries, as mutually agreed.

Article 10

This Protocol will enter into force upon signature by both Parties and will remain in force for a period of five years. The Protocol may be extended by written agreement.

This Protocol may be terminated at any time at the discretion of either Party as long as six month's advance notification to the other Party is provided in writing by the Party seeking to terminate the Protocol.

Article 11

This Protocol may be amended as necessary by written agreement of the Parties. Amendments will enter into force immediately upon signature by both Parties and form an integral part of this Protocol.

Done at [Washington, D.C., U.S.A./Beijing, P.R.C.] on the __th day of _______, 1989, in duplicate in the English and Chinese languages, both texts being equally authentic.

FOR THE DEPARTMENT OF THE INTERIOR OF THE UNITED STATES OF AMERICA	FOR THE STATE LAND ADMINISTRATION OF THE PEOPLE'S REPUBLIC OF CHINA
______________________________	______________________________

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

IN REPLY REFER TO:
1770 (760)

JAN 22 1990

Wang Xianjin
Director General
State Land Administration
A3, Huangsi Street
Beijing, People's Republic of China

Dear Mr. Wang:

During the past six months the Bureau of Land Management (BLM) has experienced several changes in leadership. I was appointed by the President to be the new Director, replacing Mr. Robert Burford. Previously, I worked for the Interior Committee of the United States House of Representatives, dealing with public land issues.

Mr. Roland Robison, the Deputy Director who led the BLM delegation to China in May, was appointed Regional Director of the Bureau of Reclamation for the Upper Colorado River Basin (located in Salt Lake City, Utah). I appointed Mr. Dean Stepanek, another member of the BLM delegation, to be our new Deputy Director. Mr. Mike Penfold, previously the BLM State Director for Alaska, is our new Assistant Director for Land and Renewable Resources.

Mr. Bob Moore is now the State Director for Colorado. We do not yet have a new Director for the Service Center.

The BLM delegation has reported to me on the purpose and results of their trip. Among other things, they informed me that you hoped to send a delegation of technical experts to the United States to discuss mined land reclamation. Do you still intend to send such a technical delegation? If so, we renew our offer to assist you in identifying experts with whom you may want to talk and reclamation projects you may want to visit.

Please inform us of your interest either directly or through the Minister-Counselor for Science and Technology at your Embassy in Washington. We look forward to working with you.

Sincerely,

Cy Jamison

Director

国家土地管理局
State Land Administration
Beijing, People's Republic of China

July 10, 1990

Mr.Kit Muller
Bureau of Land Management
U.S.A

Dear Mr.Muller:

At the beginning of 1990, your new director-general wrote a letter to Mr. Wang Xianjin to informe us of the personnel re-arrangement and ask about the visit of SLA's reclamation group to U.S.

We intend to send a reclamation expert group to visit U.S. relevant agencies in this coming October. SLA will bear the costs of the group. I am not sure whether you still act as the 'protocal officer', but I hope you would coordinate this visit.

If the visit proposal is acceptable, please let us know as early as possible.

Our office was removed. The new address: 25, Da Liu Shu Bei Cun, 100081,
Hai Dian District, Beijing, China
Telephone: 8321166 Ext 3288
Telex: 222646 cn sla

I am waiting for your kind reply.

Please give my regards to my friends in BLM.

Sincerely yours,

马瑛

Ma Ying
Foreign Affairs Office
State Land Administration

APPENDIX E

PROPOSED NATO/CCMS PILOT STUDY
ON
DESERTIFICATION

Billy
Lets discuss
Mike

IN REPLY REFER TO
7210 (910)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE
Post Office and Federal Building
P.O. Box 1449
Santa Fe, New Mexico 87504-1449

JUN 7 1990

Memorandum

To: Director (200), MIB, Rm. 5650

From: State Director, NM

Subject: NATO Pilot Project - Desertification

As you recall, I went to Lisbon last October to attend the first meeting of the Desertification Work Group. After filing my report with Kip Muller and discussing BLM's role with you, I heard nothing from the Portugal Work Group leader until this week. Now EPA and Portugal have asked for updates. Because of the short deadline, I have responded to EPA (see attached).

We need to make some definite decisions fairly quickly.

1. Does BLM want to stay in the leadership role on this pilot effort with NATO?

2. Who should take the lead on preparing a 20-page summary of desertification and major soil loss issues in the U.S. for presentation at this fall's meeting? Do we involve SCS in writing the report?

3. Who should be the focal point for this pilot and plan on continuing attendance at future meetings?

My feeling is that WO (222) should assume the lead, rather than New Mexico. If you want us to do it, give me a call and I'll get the job done.

Larry L. Woodard

1 Attachment

NATO/CCMS SPRING PLENARY
ERICE, SICILY

June 14-15, 1990

Desertification in Developed Areas

Larry L. Woodard
State Director
U.S. Representative
Bureau of Land Management
P.O. Box 1449
Santa Fe, NM 87504

Background of Pilot Study - Beginning in late 1988, the representative from Portugal to the NATO Committee on the Challenges to a Modern Society (CCMS) circulated a proposal to study the effect of desertification in developed areas. Spain has joined as a cosponsor. The Environmental Protection Agency (EPA) coordinated Bureau of Land Management (BLM) participation in the first meeting through BLM's Foreign Officer Kit Muller. EPA contact was Lynn Schoolfield.

Date/Location/Brief Report - The first meeting was held in Portugal during the period of October 17-23, 1989. The meeting quickly established that "desertification" meant different things to each nation. Iceland has experienced a dramatic loss of grasslands brought on by deforestation and overgrazing. Once the sod is exposed to arctic winds, the Icelanders have to resort to labor intensive measures, such as, placement of fish nets on the grassland edges in order to prevent wind erosion down to gravel, i.e., cold deserts.

France on the otherhand is concerned about the migration of farmers to the cities and the resultant soil erosion occurring on fallow farms which now lack daily stewardship after 2,000 years of habitation and cultivation. Spain and Portugal are having similar problems in the south of the Iberia peninsula. These three countries are not so concerned with areas actually going into deserts but are more concerned by major soil degradation as a result of small farmsteads being converted to urban sprawl, retirement villas, industrialization, or simply abandonment.

As the U.S. representative, I discussed the scope of American deserts, the water problems in the western United States and current BLM emphasis on riparian area management as a first step towards balancing the delicate ecosystems of the arid and semi-arid West. Also, I discussed the earlier desertification report issued in the early 1980's and how it failed to provide an accurate assessment of desertification in the U.S.

All parties had a common historical pattern of a 20th Century interest in soil conservation during the period of 1930-1970 (est.) and as the flight from the farm to the cities accelerated (1950-1990) our current urban society appears to have lost its interest and concern about good land use practices.

With the recent population growth and lack of effective land use controls, the prospect of NATO members losing the best agricultural areas to other use and eventually its ability to feed larger populations is evident. Desertification may be the ultimate result of improper land use, but the intermediate steps to prevent this final land use abuse was of greater concern to most participants.

Briefly, the participants discussed urban population educational needs in the area of land use, tax incentives, volunteer restoration projects, and focusing political interest on this subject in an era when policy makers already have a full array of significant environmental issues, i.e., forest loss, acid rain, global warming, etc.

Countries in Attendance - Iceland, Portugal, Spain, France, and the United States.

Dates of Next Meeting - September 4-8, 1990 in Lisbon, Portugal. The Pilot Study group will meet in conjunction with the 4-day meeting being sponsored by the European Society for Soil Conservation (see enclosure).

Progress to Date - The U.S. has not prepared a summary of significant desertification problems or a discussion of major soil erosion concerns. The Washington Office of the BLM has been asked to coordinate such a report with the Soil Conservation Service.

The primary policy issue is that this desertification problem may be a party of a larger international concern over global warming. At the September meeting, the participants will agree on some short-term studies in pilot areas. U.S. short-term studies have not been identified. By 1992, a series of potential workable recommendations to refocus interest in good land uses practices to avoid soil loss and desertification could be prepared for NATO members.

U.S. Statement to the Plenary Session - The U.S. wishes to be a cooperating nation in the study of desertification and correction of major soil losses. Much of the western U.S. is either desert or semi-arid and, thus, interested in the recommendations of this Pilot Study. Like those countries along the Mediterrain, the U.S. is experiencing similar population trends and land use problems in its semi-arid southwest region. The U.S. will look to the expertise of its principal arid land management agency, the Bureau of Land Management, and principal agriculture soil conservation agency, the Soil Conservation Service, to work with other NATO nations on this issue.

PRESENTATION REPORT AND METHODOLOGY FOR THE PILOT STUDY

ON

DESERTIFICATION IN DEVELOPED AREAS

A general meeting for the presentation of the objectives of the pilot study on Desertification in Developed Countries was held in Lisbon in October 19th and 20th.

The accepted agenda was the following:

I OPENING
National CCMS Coordinator
Prof. J. Maggiolly Novais

II INTRODUCTION AND AIMS OF THE PILOT STUDY
Portuguese Study Coordinator
Prof. Miguel A. Coutinho
Spanish Study Co-coordinator
Prof. Antonio Pou

III STATEMENT OF DESERTIFICATION. RELATED PROBLEMS IN PARTICIPATING COUNTRIES

IV DISCUSSION OF STUDY OBJECTIVES

V STUDY PROGRAM AND METHODOLOGIES

At the opening, the portuguese CCMS coordinator described the reasons presented by Portugal at the proposal of the Pilot Study. Thanking the countries that were present at the meeting (see Annex) he also indicated the names of the countries, not present, that have shown interest in participating, namely Italy, Greece and Turkey.

During the first day of the meeting, the items I to IV were covered and several key aspects were considered.

It was stressed that the word desertification is not usually understood in just one meaning and it was found that it should refer to an accelerated situation of soil degradation, either by direct or indirect causes. The particular sensitivity to desertification stresses of the countries either situated in the mediterranean area and in cold regions, was recognized.

It was found that little is known of the actual situation in the countries either in terms of the physical processes or in terms of the administrative structure that deals with the problem.

Therefore an assessment of the situations in different countries in terms of desertification will be a first objective of the study trying to ascertain the evolution of that matter from pre-industrial times (if possible) to the period of the 30's and 40's in which in many countries there was a high awareness of the problem, to the situation today. The scenario for the next 30 or 40 years could also be proposed.

In the situation today, apart from assessment of the extent of desertification, an assessment of causes should also be considered, as well as the situation in terms of the administrative measures to deal with the problem. An addendum should be prepared which would be a catalogue of present techniques in use in each country to evaluate the status of desertification.

The importance of identifying the efforts already made in evaluating and developping public awareness of the implications of the desertification issues was also recognized, in order to ensure the wide participation and support needed to implement measures which will help to control the desertification process.

During the second day of the meeting, the work of the group was focused in continuing the discussion around key issues and the definition of the study objectives.

It was decided that each country should prepare a report on its assessement of the situation including the presentation of questions of primary concern.

The reports of the countries participating in the pilot study should contain the afore mentioned information, needed for the preparation of a common report with the following format:

- Introduction
- Assessement of the situation concerning desertification and severe environmental degradation
  - General comments
  - Situation related with each participating country
- Main conclusions and recommendations

The editing of the document will be a task developed by the study coordinators.

After receiving the reports prepared by each country, which should occur before 15th July the study coordinator and co-coordinator will meet and prepare a draft of the report.

The draft of the report will then be sent to participating countries in order to be analised and commented and, afterwards a working document will be prepared to be presented to a general meeting to be held in September 1990.

The objective of the general meeting is to discuss the working document and to discuss the 2nd phase of the pilot-study*.

---

* which should involve field studies in the different countries to assess and deepen the knowledge on local problems. These studies should provide information for a final report.

The aims of the final report of this pilot study is to act as a warning document related with desertification and severe environmental degradation leading to desertification in developed countries:

It was considered that this document was necessary to guide all future research and developments in this area since there was quite little information available.

The recommendations of the study should indicate the different priorities related with each region and would contain guiding policies concerning following studies and measures to fight the situation related with desertification and desertification tendencies.

ANNEX

NATO PILOT STUDY ON

DESERTIFICATION IN DEVELOPED AREAS

PARTICIPATING MEMBERS PRESENT
AT THE MEETING IN LISBON. 19th, 20th October 1989

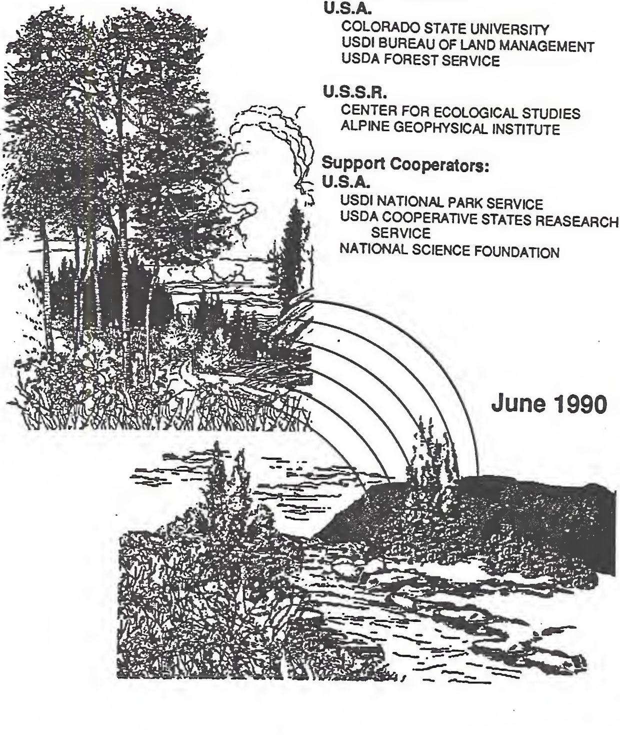
COUNTRIES	REPRESENTING PERSON	ADDRESS
FRANCE	GERARD BALENT	Institut Nationale de la Recherche Agronomique Centre de Toulouse Unité de Recherches sur les Systèmes Agraires et le Développement (URSAD) BP27 31326 CASTANET - TOLOSAN FRANCE Tel: 33-61-285258
ICELAND	STURLA FRIDRIKSSON	Agricultural Research Institute Keldnaholt. Vesturlandsveg ICELAND (ISLANDIA) Tel: 354-1-82230
PORTUGAL	JÚLIO M. NOVAIS MIGUEL AZEVEDO COUTINHO JOÃO VILA LOBOS	Instituto Superior Técnico Av. Rovisco Pais 1000 LISBOA - PORTUGAL Tel: 351-1-802045 Fax: 351-1-899242 Tlx: 63423 IST UTL P Direcção-Geral da Qualidade do Ambiente Rua do Século, 51 1200 LISBOA - PORTUGAL Tel: 351-1-373686
SPAIN	ANTONIO POU IÑIGO ASCASIBAR	Dirección General de Medio Ambiente (M.O.P.U.) P. de la Castelhaña, 67 28071 MADRID - SPAIN Tel: 34-1-2535600 Fax: 34-1-2537811
USA	LARRY L. WOODARD	State Director Bureau of Land Management P.O.Box 1449 Santa Fe, N.M. 87504 Tel: 505-988-6030

APPENDIX F

PROPOSED US/USSR
GLOBAL CHANGE RESEARCH PROJECT

Preliminary Review Draft

A STUDY OF
THE IMPACT OF GLOBAL ENVIRONMENTAL CHANGE USING PAIRED ECOSYSTEMS IN NORTH AMERICA AND THE USSR



Primary Cooperators:
U.S.A.
COLORADO STATE UNIVERSITY
USDI BUREAU OF LAND MANAGEMENT
USDA FOREST SERVICE

U.S.S.R.
CENTER FOR ECOLOGICAL STUDIES
ALPINE GEOPHYSICAL INSTITUTE

Support Cooperators:
U.S.A.
USDI NATIONAL PARK SERVICE
USDA COOPERATIVE STATES REASEARCH SERVICE
NATIONAL SCIENCE FOUNDATION

June 1990

Preliminary Review Draft

RESEARCH PLAN

A STUDY OF THE IMPACT OF GLOBAL ENVIRONMENTAL CHANGE USING PAIRED ECOSYSTEMS IN NORTH AMERICA AND THE USSR

Primary Cooperators:
U.S.A.
COLORADO STATE UNIVERSITY
USDI BUREAU OF LAND MANAGEMENT
USDA FOREST SERVICE

U.S.S.R.
CENTER FOR ECOLOGICAL STUDIES
ALPINE GEOPHYSICAL INSTITUTE

Support Cooperators:
U.S.A.
USDI NATIONAL PARK SERVICE
USDA COOPERATIVE STATES REASEARCH SERVICE
NATIONAL SCIENCE FOUNDATION

June 1990

EXECUTIVE SUMMARY

Preliminary Review Draft

Many of the lands managed by the Departments of Agriculture and the Interior in the U.S. are represented by unique ecosystems: alpine areas, tundra, forests, wetlands, shrublands and deserts. Potential changing global climate has been projected to result in increased heat and aridity in areas of North America and the western United States in particular. This may have significant ecological effects, requiring land management agencies such as the U.S. Bureau of Land Management to adopt new methods to manage vegetation, water resources and wildlife habitat. GoscomPiroda, the Soviet Environmental Ministry is facing the same issues as their government attempts to simultaneously cope with potential global climate change, development of environmentally conserving industries, and conversion to a more market oriented economy.

The following proposal is, thus, for a study of the relationship between environmental quality and environmental stresses at paired sites in the Soviet Union and North America. The four pairs of sites will be established in different climatic zones in the wilderness preservation or research natural areas of each country. The project will establish monitoring sites to assess the conditions of and any changes in atmospheric characteristics, water quality, aquatic plants and animals, and vegetation. This monitoring is expected to continue for a minimum of three years.

This study is based upon and considered to be an adjunct to the U.S. Bureau of Land Management Intermountain Wilderness Area Ecosystem Study (IWAES). As such, the monitoring sites and techniques chosen will be the same or complementary to those of IWAES.

The four ecosystem/climate types expected to be monitored are

- Polar Front/Mixed Coniferous-Deciduous Forest
- Mid-latitude/Timberline-Alpine
- Desert/Dry Savana-Shrubland
- Continental-High Pressure

The site of the Polar Front study area will be in southern Alaska. The exact site will be chosen with the help of the U.S. Bureau of LandManagement and Forest Service. The site in the USSR will be at Lake Pleshcheyevo, located approximately 100 km north of Moscow near the town of Perelslavl-Zalesksky. This location, within a large national park, has facilities of the Ecological Station of Environmental Control (ESCOS), part of the USSR branch of the World Laboratory.

The U.S. site for the Timberline/Alpine study will be at the Glacier Lakes Ecosystem Experiment Study in the Snowy Range, west of Laramie, Wyoming, at 11,400 ft MSL. Intensive long-term study by the scientists from U.S. Forest Service Rocky Mountain Forest and Range Experiment Station has occured at this site. The site in the U.S.S.R., on the slopes of Mt. Elbrus, above the village of .... on the border between the Republics of Russia and Georgia is at 11,600 ft MSL. Long-term environmental monitoring has been conducted here by scientists from the Alpine Geophysical Institute.

The Desert-Shrubland study site in the U.S. will be located at the El Malpais National Conservation Area in west-central New Mexico. Here the BLM has an active program of monitoring and management technique development with an emphasis on changing vegetation patterns. The monitoring site in the U.S.S.R. will probably be in the transition desert-grassland zone of Kyzl Kum or Kara Kum northwest of Tashkent. A research institute under GoscomHydromet in Tashkent will be contacted and a site visit planned prior to selecting the exact monitoring location.

The Continental-High Pressure area is being studied for possible impacts from ozone depletion. These areas have similar climate regimes to antarctica where the ozone "hole" was discovered ten years ago. The site best fitting this description would be on the Siberian Plateau near the town of Yatutsk southwest of the Verkhoyaniskiy Khrebe mountain range. The exact site would be chosen after contacting the AGI at Nalchik and a site visit. The corresponding North American site would be near Yellow Knife in the Northwest Territories of Canada.

This study will require approximately $300.000 each of the four years. Soviet monitoring costs will be paid by their government. Travel for project scientist within country will be paid for by the host country, between countries by the scientists country of origin.

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RESEARCH PLAN

A STUDY OF THE IMPACT OF GLOBAL ENVIRONMENTAL CHANGE USING PAIRED ECOSYSTEMS IN NORTH AMERICA AND THE USSR

I. INTRODUCTION

As long as the environmental stresses placed on the ecosystem stay within certain limits, the quality of the environment of that ecosystem is usually not significantly impacted (Figure 1). When the stresses resulting from natural causes (drought, excess precipitation or other climatic fluctuations, predator/prey relationships, etc.) or man-made (air and water pollution, overgrazing by domestic animals, deforestation, etc.), increase beyond certain, often undefined limits, the quality of the environment will usually decrease rapidly. If the stresses are not mitigated, or at least held below an acceptable limit, the damage to the ecosystem may be irrepairable. Management of natural ecosystems requires that the causes of the stresses together with the levels of acceptable changes in each of the components of the ecosystem be identified.

Of particular concern at the present time is the potential impact of long term global climatic changes on ecosystems. Many of the lands managed by the Departments of Agriculture and the Interior in the U.S. are represented by unique ecosystems -- alpine areas, tundra, forests, wetlands, shrublands and deserts. A changing global climate, projected to result in increased heat and aridity, may have significant effects and may require new methods to manage vegetation, water resources and wildlife habitat. In addition, new mitigation technologies may be required to prevent significant adverse impacts such as desertification and soil erosion.

The first impacts on most natural ecosystems resulting from such global changes as greenhouse warming and ozone depletion will most probably be reflected in changes in the following four components:

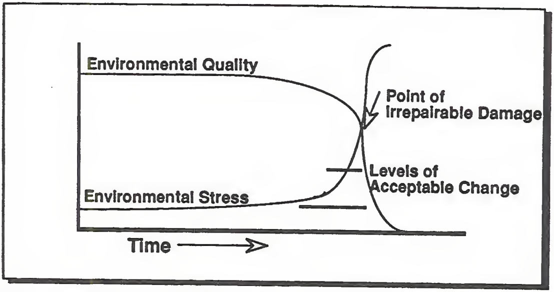

Figure 1. Relationship Between Environmental Quality and Environmental Stresses

- Atmosphere
- Water Quality
- Limnology
- Vegetation

While other components of some ecosystems will undoubtedly also be impacted by global changes in climate, (for example, soils, wildlife and geology) it is expected that with small changes in climate, such changes will neither be as dramatic nor will they occur as quickly. The features of each of the above components (see Figure 2. Components, Feature, and Attribute Model for Wilderness Monitoring) which will reflect the changes will undoubtedly be different in different climatic zones at different latitudes and at different elevations. Changes can and often do occur in each of these components from other natural and anthropogenic causes, however, which may confuse if not completely mask the longer term, more subtle effects of the global climate changes taking place. This proposal is directed toward the establishment of a carefully designed monitoring program involving paired ecosystems on two continents which might be expected to provide data for the quantification of the rate of changes taking place in these ecosystems and the separation of natural and anthropogenic causes for the changes.

II. GOALS AND OBJECTIVES[1]

The following proposal describes the techniques, sites and logistics required for the study to be undertaken. First, six goals of the study are given.

1. To establish a set of four paired ecosystems in different climatic zones in the wilderness preservation areas of North America and the USSR to measure the rate of change taking place in attributes of certain features of each of the above components.

2. To design and establish a set of monitoring protocols for selected features of each of the above components for each of the monitoring sites.

3. To conduct attribute monitoring required by the protocols for each component at each of the paired ecosystems for a period of at least three years. (three years for this proposal).

4. To reduce and analyze the data collected to determine the rate of change taking place in each of the components, to determine the frequency of measurements required for long term monitoring and to determine, if possible, the specific causes of the stresses which are producing in the changes.

5. To establish limits of acceptable change (LAC)[2] in the attributes of the features which were measured for each component.

6. To prepare an initial draft of recommendations on the possible mitigation and management procedures to address the issues identified.

III. RESEARCH APPROACH

A. THE PAIRED ECOSYSTEMS. The pairs of ecosystems used in this investigation were selected primarily on the basis of

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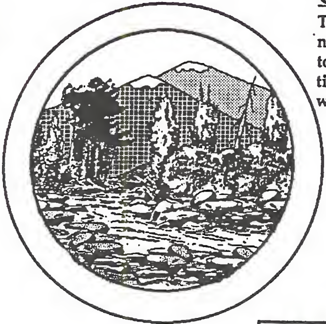
[1] This proposal is submitted as adjunct to and based upon the BLM IWAES project research plan. The concept of ecosystem components, features and attributes is included in the IWAES research plan. Details of establishing monitoring protocols, establishing and following QA/QC inspection cycles, using the Wildland Resources Information Data System (WRIDS) for data storage and analysis, etc. are also addressed in IWAES. Pertinent portions of the IWAES research plan are included in Appendix A.

[2] Limits of Accepatble Change (LAC) are used in this context to mean the amount of change which an attribute might sustain without resulting in the loss of wilderness or natural resource value to a particular feature. This concerpect is roughly taken for Stankey, et. al. (1980) and has been more fully elaborated by Marlatt, et. al. (1989).

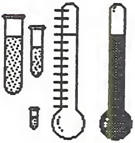
Components:

The large-scale factors that give the wilderness character to a particular area. These are too broad to be measured, but are often mentioned in enabling legislation. An example is water resources.



Features:

Smaller scale items of which components are built up. They can be counted and pointed out as individuals, but cannot be measured. For the component water resources, streams are a feature.



Attributes:

Measurable qualities of a feature. For the COMPONENT 'Water Resources,' and its FEATURE 'A Stream,' the ATTRIBUTE 'Water Alkalinity' can be measured. It can be assigned a single value and tracked for trends over time.

Figure 2. Component, Feature, Attribute Model for Wilderness Monitoring

comparability in at least several of the components to be studied. Freedom from potential impacts from onsite or nearby anthropogenic activities and sources of pollutants, accessibility to the location and jurisdictional responsibility were also considered.

1. The Polar Front/Mixed Coniferous-Deciduous Forest Ecosystem. One of the anticipated climatic changes that may occur as a result of the global warming will be a shift in the favored location of the polar front. The polar front is the zone separating cold polar air from midlatitude warmer air. This zone, on the average, is located at approximately 50-60 degrees above the equator. It is a region in which the warmer southwesterly winds override the cold, dense polar easterly winds. As a result, the polar front zone is noted for a large number of cloudy days with frequent precipitation.

Figure 3. shows the locations of the pair of ecosystems that will be compared in the polar front zone.

The site in the USSR is at Lake Pleshcheyevo located approximately 100 km north of Moscow near the town of Pereslavl-Zalessky (56°N). This location is part of theEcological Station of Environmental Control (ESCOS) being established by the USSR Branch of the World Laboratory. It is situated within a large national park with no significant incompatible activities in the region. There are actually two lakes (the second considerably smaller) and a small river (tributary to the Volga river) within the park. Research laboratories and housing for resident and visiting scientist are currently being constructed.
Planned research activities at ESCOS during the next several years such as laser studies of cloud chemistry, CO_2 monitoring, etc., will be compatible with the proposed monitoring program and will thus provide supplimental data.

The site for the IWAES aerometric station will be in a clearing along the stream. It is accessible by a short walk from a cabin once used as a summer home by Stalin's son.

The site in the U.S. will be located somewhere in southern Alaska, probably near Juneau or Skagway (58°N). The exact site has not yet been selected, however we will work with the USBLM, USNPS and USFS research personnel in the state to select an area with ecosystem components which will most closely match those at the USSR ESCOS.

2. The Mid-latitude Timberline/Alpine Ecosystem. Two possible scenarios suggested as significant parts of climate change are greenhouse warming resulting from increased CO2 and other gases which trap outgoing infrared radiation, and increased ultraviolet radiation at the surface resulting from chemical "thinning" of the ozone layer. It is anticipated that both could have marked impacts upon ecosystems at or above timberline. In the case of the warming condition, certain species of trees and other lower elevation vegetation might be expected to "climb up the mountain." On the other hand, increased intensity of ultraviolet radiation could have a damaging effect on vegetation and other components of the ecosystem (for example, limnology since UV radiation penetrates into water to a considerable distance). In addition, changes in temperature and/or vegetation could influence the mountain and valley wind fields which in turn could result in changes in long range transport of pollutants into these ecosystems.

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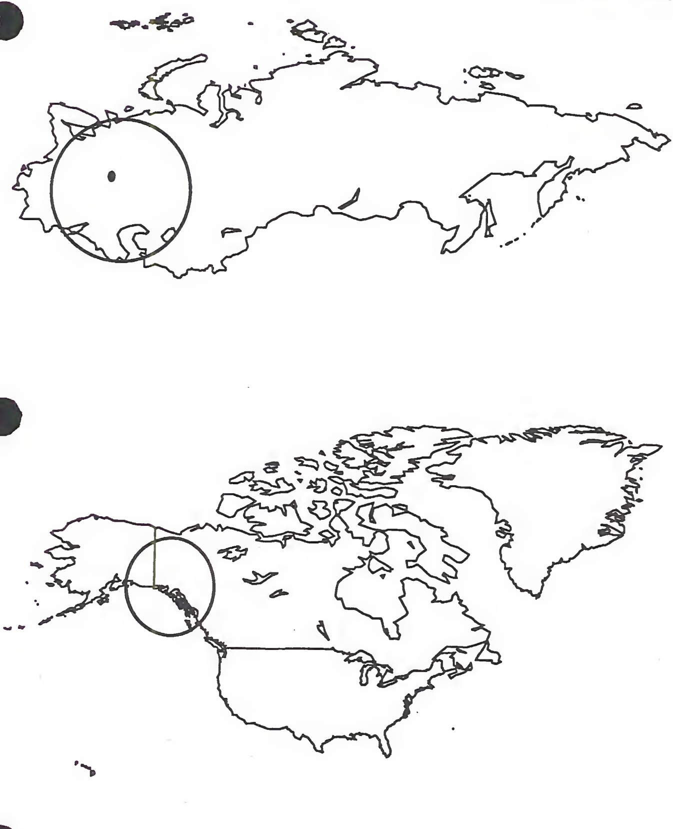
[1] The use of ——— for names of certain places is used in this draft since the word processor program used does not include the Russian alphabet and no translation is immediately available.



igure 3. Sites of the Polar Front Study Ecosystems in Alaska and in the USSR.

Figure 4. shows the locations of the pair of ecosystems that will be compared at the mid-latitude timberline sites.

The site in the USSR is at timberline approximately 11,600 ft. (lat. 43°N) on the slope of Mt. Elbrus above the village of .... Mt. Elbrus is located on the border between the Republics of Russia and Georgia between the Black Sea and the Caspian Sea. There are no lakes in the immediate vicinity but there is a stream which carries water from a large glacier to the valley below. Ongoing long term monitoring of this stream indicates that the glacier is very sensitive to long range transport of pollutants into the area. The site for the aerometric station will be along a road (trail) used by the Atmospheric Optics Research program of the Alpine Geophysical Institute (AGI) for a "laser road" - the path between the target and laser sensors used in measuring CO2, O3, SO2 and many other trace gases[4]. In addition to the optics research station located about 500 feet above the proposed aerometric station location, the AGI has a complete field station with housing, laboratories, etc. in the village. Long term studies of avalanche control, snow physics and atmospheric optics are ongoing at this station, including such measurements as snow and rain chemistry, stream chemistry, etc. The AGI, which will be the primary cooperating organization for the USSR, will make any and all data collected at the Elbrus laboratory available to the program.

The site in the U.S. will be the at timberline (aprox. 11,400 ft., lat. 41°N) at the Glacier Lakes Ecosystemy Experiment Study (GLEES) in the Snowy Range in Wyoming west of Laramie. This site is currently being used for atmospheric/ecosystem studies by the Rocky Mtn. Forest and Range Expt. Station, USFS, the BLM, the Univ. of Wyo. and Colo. State University. It is the site where the USFS, BLM, and CSU are developing and testing certain components of the aerometric station. Air. rain, snow, lake and stream water chemistry monitoring are currently being conducted at the Snowy Range site. Measurements are also being conducted for limnology and vegetation at GLEES.

3. The Desert - Dry Savana/Shrubland Ecosystem. The potential for increased heat and aridity resulting from global change will require new approaches to managment of grazing lands of the USBLM and other federal land management agencies. The transition ecosystems between the desert and steppe areas might well be the locations where the impacts of global warming would be first recognized.

Fig. 5. shows the locations of the pair of ecosystems that will be compared at the desert - grassland/brushland sites. The site in the U.S. will be the El Malpais National Conservation Area in west-central New Mexico (lat. 35°N). The BLM has an active program of monitoring and managment technique development at this site with emphasis on changing vegetation patterns and the use of biophysical land units[5] for mapping ecosystem boundaries. The IWAES project has already developed an ongoing relationship with the program at El Malpais and this site is being considered for establishment of one of the primary IWAES project sites.

The monitoring site in the USSR has not been precisely defined as of this writing. It will be in the transition desert - grassland zone probably in either the Kyzyl Kum or Kara Kum regions (lat. 40°N) of Turkmenistan or Uzbekistan in the general Tashkent area north of the border with Pakastin and Afganistan. There is a research institute under GoscomHydromet

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Trace gas measurements made by the AGI are done on only a few days each season. The siting of an IWAES aerometric station at this location will allow a sensor comparisons to be made and thus potentially can extend the amount of data from this site.

[5] The concept of biophysical land units (BLUs), a land unit designation based on physical and ecological land factors, was first described by geographers in the early 1970's. The BLM has refined this concept using remote sensing and geographic information system (GIS) technology (Berger, 1990).

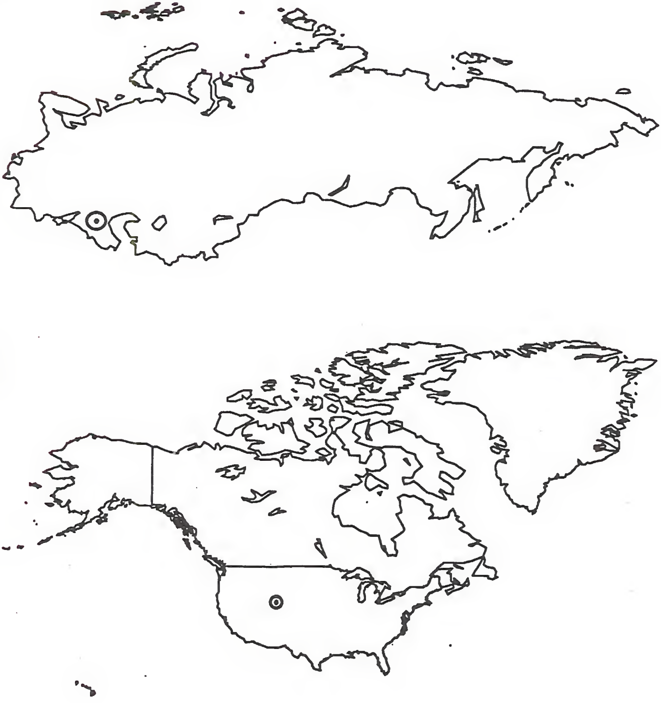


Figure 4. Sites of the Timberline/Alpine Study Ecosystems in Wyoming and in the USSR.

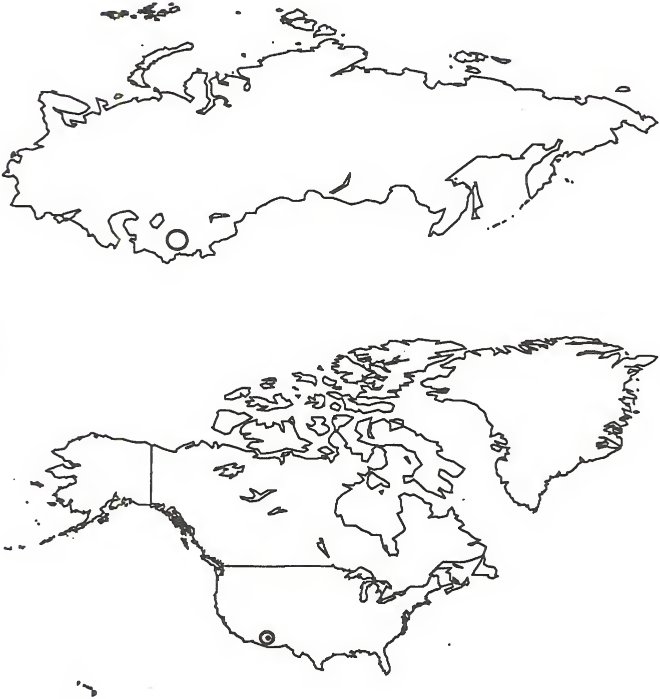


Figure 5. **Sites of the Desert - Dry Savanna/Shrubland Study Ecosystems in New Mexico and in the USSR.**

(as is the AGI) located at Tashkent. The AGI staff will contact this institute to make preliminary arrangements and a site visit will be made to select the exact monitoring location.

4. The Continental High Pressure (Ozone Depletion) Monitoring Sites. Recent research has shown that the "ozone hole" found over the Antarctic continent occurs primarily during the spring season when both extremely low temperatures (-80°C) and daylight exist at the same time. Measurements made near the North Pole indicate that, at least during the past winter, the thinning of the ozone layer in this area is not nearly as great as it is over the South Pole.

This location, near the center of the the "meteorological North Pole" is associated with the large high pressure area over the eastern half of Siberia. The area is known for its months of clear skies and bitterly cold temperatures during winter might thus have climatic conditions similar to those associated with the Ozone layer thinning over the Antarctic.

Figure 6. shows the locations of sites selected near the center of the favored positions for high pressure during winter in Canada and the USSR.

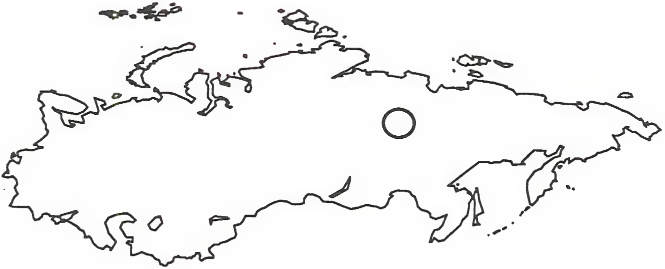
The site selected in Siberia is near the town of Yakutsk on the Siberian Plateau southwest of the Verkhoyaniskiy Khrebe mountain range (lat. 62°N). The Alpine Geophysical Institute at Nalchik will make preliminary contact with the Hydromet program at Yakutsk before a site visit is made.

The site tentatively selected in North America is at Yellow Knife in the Northwest Territories of Canada (lat. 62°N). This site, at approximately the same latitude and elevation as Yakutsk, also enjoys the frequent presence of a (albeit not so cold) strong continental polar high pressure center during winter.

B. Monitoring Procedures. This project is considered an adjunct to the BLM IWAES project. As such, monitoring techniques used by this project will conform to those of IWAES, to the extent possible.

1. Surface Water Quality, Limnology and Vegetation. The monitoring experiment will be conducted as follows: (For this we use the example of water quality but the procedures will be the same for each of the three components.)

- One scientist plus one assistant (graduate student, post doctorate, or another scientist) will be selected for studying the water quality component by the U.S. One scientist plus one assistant will be also selected for this component by the USSR.
- Using protocols developed by the USFS and USBLM (see IWAES research plan), (and equivalent protocols developed in the USSR, if any), the two teams of scientists will, through correspondence, develop measurement plans for each of the four sites in the N.A. and each of the four sites in the USSR. This will involve exchanges of maps, ideas and plans for measurements, analyses, etc.
- During one two-month period (probably May-June or June-July) of each year for three years, the teams of scientists will conduct field monitoring measurements at each of the eight sites. During these periods, all teams will work and travel together to gain experience and understanding of monitoring approaches used by the other



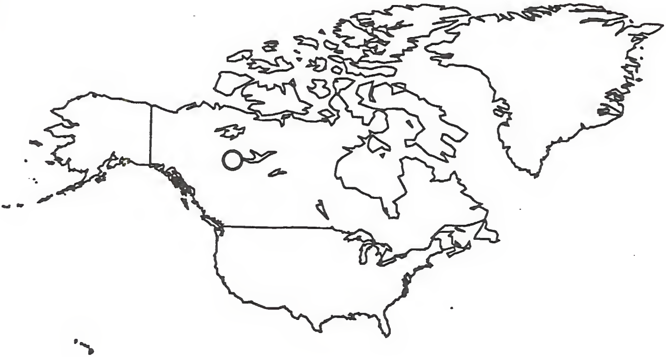


Figure 6. Sites of the Polar High Pressure Region Study Ecosystems in Northwest Territories, Canada and at Yatutsk, Yakut ASSR, USSR.

country as well as the developing of sensitive techniques for determining ecosystem changes.

- After the third year, the scientist teams for each component will prepare a final report (annual reports will also be required) indicating any evidence of ecosystem changes, quantitative amounts of such changes, the probable cause(s) for the changes identified, possible limits of acceptable change for selected feature attributes, and recommendations on the frequency and approach needed to continue the monitoring on a long term basis.

2. Air Quality and Meteorology. The air quality/meteorology program will follow much the same procedures as those listed above for the other three components with a few important differences.

- Instead of the U.S./USSR scientist teams going to each site for a short field measurement program once per year, an aerometric station like the ones used by the USBLM in wilderness areas will be installed at each of the sites. The aerometric station is described in IWAEWS (Appendix A). In brief, however, sensors are included to monitor SO2 and SO4, NOx, O3, PM2.5 and PM10 particulates, precipitation amounts and chemistry, solar radiation, UVb radiation, wind direction, wind speed, air and soil temperatures and air humidity. The stations are solar powered and require only monthly visits to change filters for the gas sampling, etc. All other data are recorded on solid state data loggers.

- The aerometric stations will be operated by technicians from the local areas. In most cases, this will be by a graduate student or researcher located at an institute or federal agency office which is cooperating with the study. (There are other alternatives which might be considered here including using volunteers from the Earthwatch organization, etc..)

- Details of the operation of the aerometric stations remain to be worked out. It is possible that the gas sample filter and precipitation chemistry analyses can be done at one HydroMet laboratory in Moscow for filters exposed at the USSR sites and at one laboratory (the chosen IWAES project laboratory) in the U.S. Alternately, it might be better to store the filters at each site, have them shipped to the IWAES project at three or six month intervals with the meteorology data logger storage modules, and have all filter analyses be completed at the IWAES laboratory in the U.S. (Without having yet visited the HydroMet lab in Moscow, the latter approach would appear to be favored if for no other reason than to assure more consistant quality control.)

IV. PROJECT MANAGEMENT

A. PERSONNEL The Principal Investigator and Program Director will be Dr. William E. Marlatt, Professor of Air Resources and Biometeorology, Dept. of Earth Resources, Colorado State University, Fort Collins, Colorado, USA 80523.

- Conduct laboratory analyses as necessary.
- Prepare first progress reports.

FY 1993:

- Continue monitoring and analyses of data from aerometric stations.
- Conduct second field program in monitoring of water quality, limnology and vegetation.
- Conduct laboratory analyses as required.
- Prepare second progress reports.

FY 1994:

- Continue monitoring and analyses of data from aerometric stations.
- Conduct third field program in monitoring of water quality, limnology and vegetation.
- Conduct laboratory analyses as required.
- Prepare comprehensive report of findings from all monitoring programs for all components for each pair of ecosystem locations.
- Sponsor an international symposium on the results of the three years of monitoring of paired ecosystems in North America and the USSR.
- Prepare a document establishing the limits of acceptable change for each of the features of the components studied in each paired ecosystem.
- Prepare a document identifying, if possible, the causes of the stresses which produce the changes in each of the components for each paired ecosystem.
- Prepare a draft of recommendations on the possible mitigation and management procedures to address the ecosystem component stresses identified.

C. Budget and Financial Considerations. The following budget is considered extremely tentative. For example, travel and shipping costs of instrumentation are only educated guesses.

The Soviet counterparts with whom the ideas for the proposal were developed have agreed that all Soviet scientists on the monitoring teams will be paid by the USSR. All in-country expenses (per diem, etc., will be paid by the host country, i.e. for the field monitoring programs in N.A., all team travel and per diem expenses will be paid by the U.S.; for the field monitoring programs in the USSR, all team travel and per diem expenses will be paid by the Soviets. Internation portions of the travel will be paid by the scientist's home country.

Table 1(Continued)

Estimated Budget: By Fiscal Year, Country, and Category
Part B. Water Quality, Limnology, and Vegetation

Country	U.S.A.				U.S.S.R.			
Fiscal Year	1991	1992	1993	1994	1991	1992	1993	1994
STAFFING								
Project Leader								
Co-Investigator								
Graduate Research Asstant								
Secretarial Services								
Total								
CAPITAL EQUIPMENT								
As needed								
To be supplied by each scientist's home country								
Total								
MATERIALS AND SUPPLIES								
Calibration/Lab supplies								
QA/QC requirements (??)								
Office supplies & misc.								
Total								
OTHER DIRECT COSTS								
Telephone/Communications								
Sample analysis/ Data reduction								
Report Preparation								
Total								
TRAVEL								
Person round trips to U.S.S.R.								
Person round trips to U.S.A.								
Per diem expenses								
Total								
TOTAL PART B								

Preliminary Review Draft

Table 1 (Continued)

Estimated Budget: By Fiscal Year, Country and Category
Part C. Program Administration

Country Fiscal Year	U.S.A. 1991	1992	1993	1994	U.S.S.R. 1991	1992	1993	1994
STAFFING Program Manager Co-Investigator Administrative Assistant Secretarial Services Total								
CAPITAL EQUIPMENT Total								
MATERIALS AND SUPPLIES Office supplies & misc. Total								
OTHER DIRECT COSTS Telephone/Communications Total								
TRAVEL Person round trips to Washington, DC Total								
TOTAL PART C								

Total Part A		
Total Part B		
Total Part C		
Project Totals		